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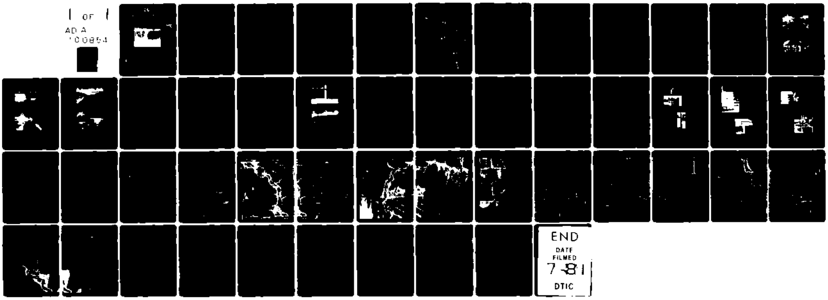


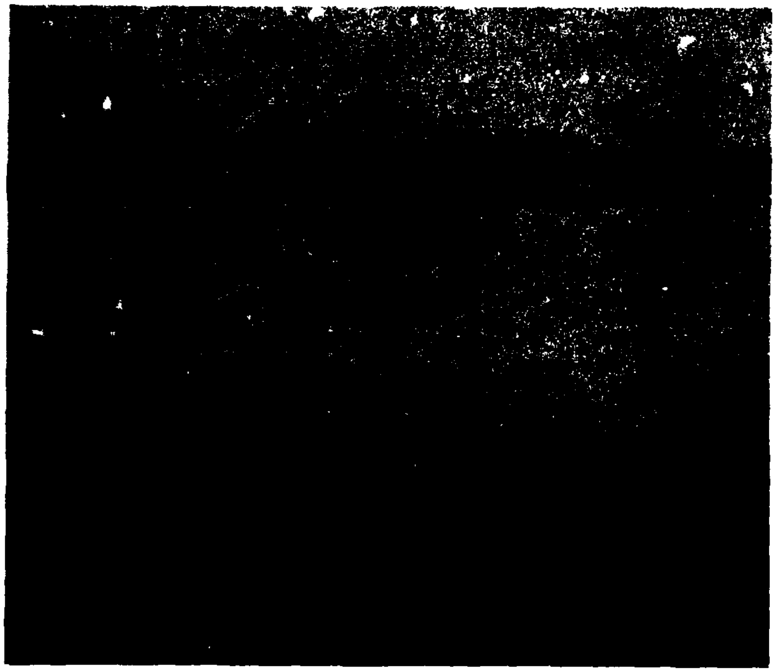
LEVEL

# FLOOD PLAIN INFORMATION

# OTTAWA RIVER-TENMILE CREEK

## SYLVANIA AND VICINITY
## LUCAS COUNTY, OHIO







PREPARED FOR
OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PLANNING, FLOOD PLAIN MANAGEMENT SECTION
AND
TOLEDO METROPOLITAN AREA COUNCIL OF GOVERNMENTS
TOLEDO-LUCAS COUNTY PLAN COMMISSIONS
MAUMEE WATERSHED CONSERVANCY DISTRICT
SYLVANIA MUNICIPAL PLANNING COMMISSION

BY

CORPS OF ENGINEERS U. S. ARMY
DETROIT DISTRICT
JUNE 1975

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# REPORT DOCUMENTATION PAGE

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A knowledge of flood potential ad its hazards is an essential ingredient of comprehensive land use planning and management decisions concerning flood plain utilization. The information contained herein will not only assist local authorities and residents to better understand the causes of their flood problems, but will also provide necessary guidance in determining the best use of flood prone lands along Ottawa River and Tenmile Creek. This report is based on hydrological facts, historic data, and other technical informaion having a bearing

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on the occurrence and magnitude of flood discharges within the study area. Included are maps, profiles, photographs, and cross sections which indicate the extent of flooding that might occur in the future.

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**CONTENTS** (Continued)

## TABLES



## PLATES



## FIGURES



Cover photo - July 15, 1958 flood in Sylvania Township, west of Herr Road.

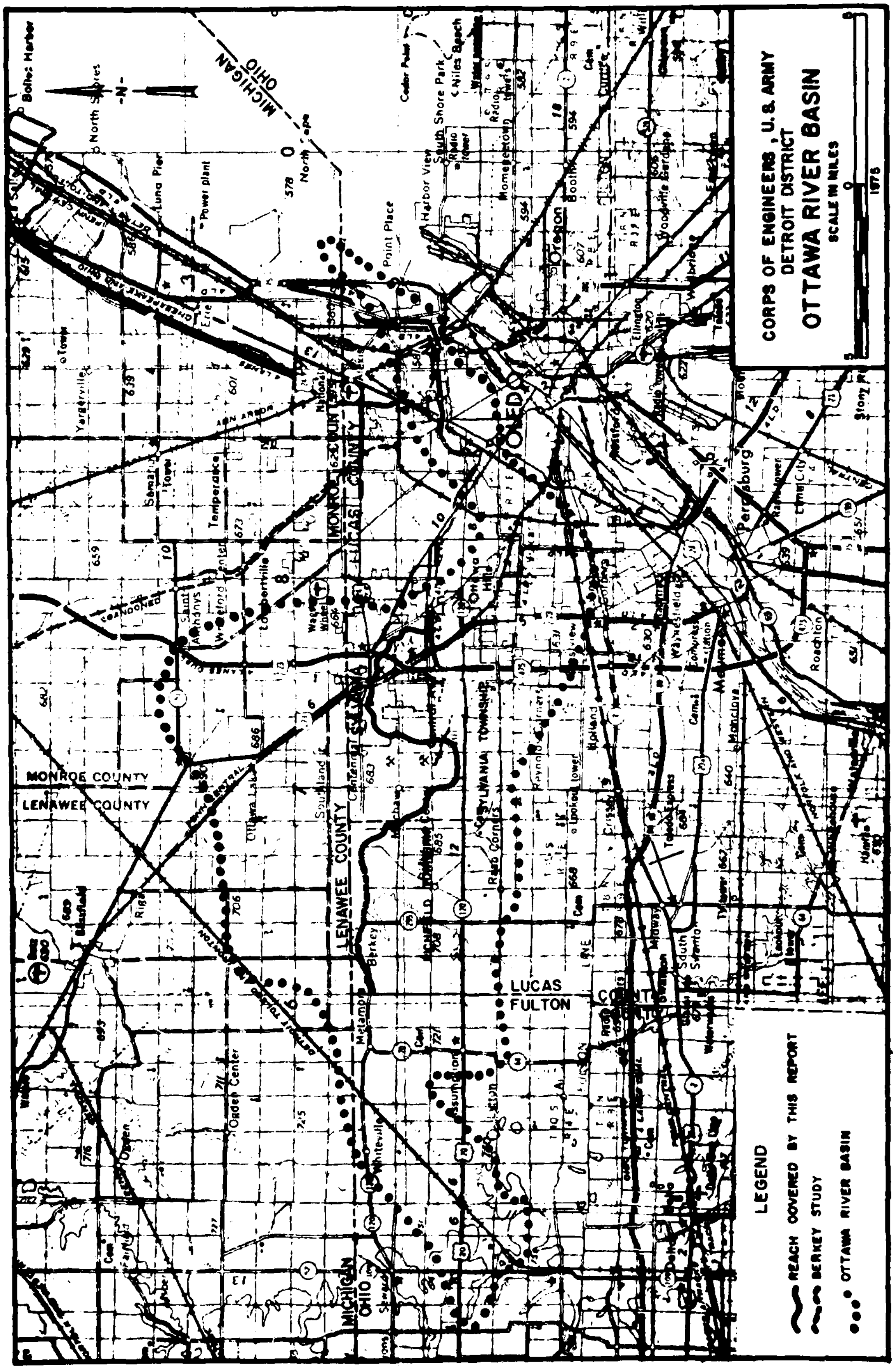

CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT
OTTAWA RIVER BASIN
SCALE IN MILES
1975
LEGEND
REACH COVERED BY THIS REPORT
BERKEY STUDY
OTTAWA RIVER BASIN
MICHIGAN
OHIO
MONROE COUNTY
LENAWEE COUNTY
LUCAS
FULTON
SYLVANIA TOWNSHIP

PLATE 1

## PREFACE

The study reaches of the Ottawa River and Tenmile Creek flood plains covered by this report extend 14.09 miles upstream from the Interstate 475 highway bridge over Ottawa River to the east village limit of Berkey on Tenmile Creek (Plates 1 and 2). It includes 2.74 miles of Tenmile Creek through Richfield Township, 6.04 through Sylvania Township, and 2.18 through the City of Sylvania to its confluence with North Branch Tenmile Creek. From that point, Ottawa River flows 1.32 miles through the City of Sylvania and 1.81 through Sylvania Township to the lower limit of the study area. The drainage area tributary to the Ottawa River at the Interstate 475 highway bridge is 125.37 square miles.

A knowledge of flood potential and its hazards is an essential ingredient of comprehensive land use planning and management decisions concerning flood plain utilization. The information contained herein will not only assist local authorities and residents to better understand the causes of their flood problems, but will also provide necessary guidance in determining the best use of flood prone lands along Ottawa River and Tenmile Creek. The report focuses attention on these flood prone lands and their environmental qualities, and their value as a natural resource.

The purpose of this study is to collect and develop information on past and probable future floods. It will not only assist local authorities with future studies, planning, and action designed to eliminate or reduce flood hazards, but will also help to avoid future damages likely to be associated with development in flood plain areas. With it, development in flood prone areas can be planned at elevations high enough to avoid flood damages or at least with full recognition of the chance or hazards of flooding that exist.

This report is based on hydrological facts, historic flood data, and other technical information having a bearing on the occurrence and magnitude of flood discharges within the study area. Included are maps, profiles, photographs, and cross sections which indicate the extent of flooding that might occur in the future. Properly used, this information will support sound flood plain management. The maps, profiles, and cross sections indicate the depth of probable flooding at any location by the occurrence of the 50 year, Intermediate Regional (100 year), or Standard Project Flood.

Alternative solutions to flood problems are not included. However, the report provides the basis for further study and planning on the part of local governments to arrive at solutions which will minimize future flood damages. This can be accomplished by local planning programs which guide development and land use in the flood plain through zoning, building codes, health regulations, and other regulatory methods. Pamphlets and guides pertaining to flood plain regulations, flood proofing, and other related actions have been prepared by the Corps of Engineers. They are available to state agencies, local governments, and citizens for planning and action to reduce flood damage potential.

This report was prepared for the Toledo Metropolitan Area Council of Governments, the Toledo Lucas County Plan Commissions, the Maumee Watershed Conservancy District, and the Sylvania Municipal Planning Commission. Coordination was effected through the Flood Plain Management Section of the Division of Planning, Ohio Department of Natural Resources. Copies of the report will be made available to interested agencies and individuals through these organizations. The Detroit District, Corps of Engineers, and the Flood Plain Management Section of the Division of Planning, Ohio Department of Natural Resources will assist planning agencies in the interpretation and use of the data presented, as well as the development of additional technical information

## BACKGROUND INFORMATION

### Settlement

The first settlers arrived in 1832, locating on the north bank of the Ottawa River, now the City of Sylvania. The village plat of Whiteford was filed July 11, 1835, and that of the Village of Sylvania the following year. In 1866, the two villages were consolidated and incorporated. In 1910, the village population was about 1,000 and had grown to 5,200 in 1960, at which time Sylvania was proclaimed a city. As of the last census, the population had more than doubled to 12,000. That portion of Sylvania Township outside of the city has also exhibited considerable growth with the population increasing from 2,000 to 17,000 between 1920 and 1970.

The first settlers arrived in Richfield Township May 1834, locating near the southeast corner of the township. Richfield is primarily an agricultural township and, as such, has not grown as rapidly as Sylvania. In 1920, the township population was 1,000 and by 1970 had only increased by 500. Consistent with historical precedent, both communities located on the best available communication network of that day - a stream capable of commercial transport. This was done without regard for the potential flood problems of today.

### The Stream and Its Valley

The Ottawa River and its tributaries drain an area of about 172 square miles of which about 125 are tributary to the downstream limit of the study area as shown in Table 1.

**TABLE 1**

**DRAINAGE AREAS IN THE OTTAWA RIVER WATERSHED**

| Stream | Location | River Mile, above mouth of Ottawa River | Drainage Area, sq. mi. |
|---|---|---|---|
| Ottawa River | At Mouth | 0.0 | 172[1] |
| Ottawa River | At Toledo | 11.65 | 150[1] |
| Ottawa River | Below Schlicker Ditch | 16.4 | 126.60 |
| Schlicker Ditch | At Mouth | | .96 |
| Ottawa River | Above Schlicker Ditch | 16.4 | 125.74 |
| Ottawa River | At Downstream Study Limit | 16.81 | 125.37 |
| Ottawa River | Below Harroun Ditch | 17.7 | 122.59 |
| Harroun Ditch | At Mouth | | .18 |
| Ottawa River | Above Harroun Ditch | 17.7 | 122.41 |
| Ottawa River | At Confluence of Tenmile Creek and North Branch Tenmile Creek | 19.95 | 120[1] |

**TABLE 1** (Continued)

| Stream | Location | River Mile, above mouth of Ottawa River | Drainage Area, sq. mi. |
|---|---|---|---|
| North Branch of Tenmile Creek | At Confluence with Tenmile Creek | 19.95 | 39.3[1] |
| Tenmile Creek | At Confluence with North Branch Tenmile Creek | 19.95 | 80.7 |
| Tenmile Creek | Below Heath Ditch | 20.24 | 80.43 |
| Heath Ditch | At Mouth | 20.24 | .81 |
| Tenmile Creek | Above Heath Ditch | 20.24 | 79.62 |
| Tenmile Creek | Below Schreiber Ditch | 21.98 | 76.25 |
| Schreiber Ditch | At Mouth | 21.98 | 3.04 |
| Tenmile Creek | Above Schreiber Ditch | 21.98 | 73.21 |
| Tenmile Creek | Below Comstock and Smith Ditch | 24.23 | 71.08 |
| Comstock and Smith Ditch | At Mouth | 24.23 | 4.04 |
| Tenmile Creek | Above Comstock and Smith Ditch | 24.23 | 67.04 |
| Tenmile Creek | Below Prairie Ditch | 26.1 | 64.40[1] |
| Prairie Ditch | At Mouth | 26.1 | 17.6[1] |
| Tenmile Creek | Above Prairie Ditch | 26.1 | 46.8[1] |
| Tenmile Creek | Below Smith Ditch | 26.38 | 46.72 |
| Smith Ditch | At Mouth | 26.38 | 1.68 |
| Tenmile Creek | Above Smith Ditch | 26.38 | 45.04 |
| Tenmile Creek | Below Butler Ditch | 27.88 | 43.35 |
| Butler Ditch | At Mouth | 27.88 | 1.99 |
| Tenmile Creek | Above Butler Ditch | 27.88 | 41.36 |
| Tenmile Creek | Below Roberts Ditch | 30.3 | 37.76 |
| Roberts Ditch | At Mouth | 30.3 | 1.85 |
| Tenmile Creek | Above Roberts Ditch | 30.3 | 35.91 |
| Tenmile Creek | At Upstream Study Limit | 30.9 | 35.55 |

[1] These areas are from "Drainage Areas of Ohio Streams, Supplement to Gazetteer of Ohio Streams" prepared by the U.S. Geological Survey in cooperation with the Ohio Department of Natural Resources. Ohio Water Plan Inventory, Report 12a, 1967. All other values were determined as a part of this flood plain information study.

Tenmile Creek from the upstream study limit forms a large "U" flowing southeast, east and then northeast into Sylvania where North Branch Tenmile Creek enters. Their confluence forms the Ottawa River which flows in a southeasterly direction to the downstream limit of the study area. The Ottawa River watershed is bounded by the River Raisin basin on the north and by the Maumee River basin on the south.

There is a dramatic change in the topography from the lower to the upper limit of the study area. At the lower limit and throughout the City of Sylvania, Ottawa River flows in a well defined valley while the upstream portion of Tenmile Creek flows through flat lands which are typical of the lake plains of the central lowlands physiographic province. This difference is illustrated by the cross sections at the end of the report.

Over their total 41.6 mile length, Ottawa River and Tenmile Creek rise from an elevation of 573 at the mouth of Ottawa River in North Maumee Bay to an elevation of 738 at the source of Tenmile Creek, for an average gradient of 4 feet per mile. Within the study area, however, the river rises 87.3 feet from an elevation of 594.7 to 682.0 at the downstream and upstream study limits, respectively, for an average gradient of 6.2 feet per mile over the study limit. There is a distinct change in stream gradient near river mile 22 as shown on the flood profiles at the end of the report. Upstream of this point, the gradient is 4.3 feet per mile, which is approximately the same as the overall gradient. Downstream of river mile 22, however, the gradient increases to 9.4 feet per mile.

The rather abrupt change in stream gradients is significant with respect to stream velocities. These can be so increased as to cause forces great enough to subject urbanized areas to the increased danger of structural as well as ordinary water damage. Where flows are impeded, particularly at existing bridges, flooded outlines are shown to fan out in a rather dramatic manner because of obstructed flood waters. The area of inundation would be easily enlarged with an accumulation of ice or debris at the bridge openings.

**Development in the Flood Plain**

The flooded areas examined in this report are shown on the six sheets, Plates 3 through 8. They are mostly pasture, farmland, and wooded areas, with only a small amount of industrial, commercial, and residential development. Particularly significant is the development of highway and railroad systems throughout this area. Overall, 27 bridges cross the 14.09 mile reach of Ottawa River and Tenmile Creek covered by this report. The effect of these bridges on flooding is described in the next part.

## FLOOD SITUATION

### Data Sources and Records

Currently there are no stream gaging stations in the watershed. In March, 1945, a wire weight gage was installed on what was then called Tenmile Creek[1] at the Secor Road Bridge in Toledo. In April that same year, a water stage recorder was installed at the same location. Measurements at this site were discontinued after September, 1948. Actual rainfall versus measured discharge at this gage for floods during May, 1945, and June, 1947, were compared against results of computed discharges used in this report. The results compared reasonable well.

In addition to these stream gaging records, dates and heights of past floods were provided by the Lucas County Engineer, and photographs of a past flood were provided by a Richfield Township Trustee. Descriptions of floods are based on research of newspaper files.

Base maps prepared for this report were enlarged from portions of U. S. Geological Survey quadrangle sheets entitled, "Sylvania, Ohio Mich.," dated 1965 and "Berkey, Ohio Mich.," dated 1966. Where available, two foot contour maps of the City of Sylvania were used as a guide to provide a more accurate delination of flood limits. These maps were prepared in March, 1970. Channel cross sections and bridge data were obtained from field surveys.

### Flood Season and Flood Characteristics

Within the study area, precipitation is normally abundant and well distributed throughout the year. Showers and thunderstorms account for most of the rainfall during summer and spring. Thunderstorms occur on about 40 days each year, most of which occur during the months of April through August. Depending on their intensity and duration, these thunderstorms may cause flooding.

Although most precipitation during the winter months comes in the form of rain, snowfall averages 30 inches and is distributed throughout the months of November through March. Generally, the crucial flood periods occur as a result of heavy winter and spring rains coupled with snow melt.

### Factors Affecting Flooding and Its Impact

**Obstructions to flood flows** - Natural obstructions to flood flows include trees, brush, and other vegetation growing along the stream banks in the flood plain. Man made encroachments and constrictions such as dams, bridges, floodwalls, levees, and highway and railroad embankments can also create more extensive flooding than would otherwise occur. Six of the 27 bridges that cross the flood plains of Ottawa River and Tenmile Creek within the study limits are shown on Figures 1 and 2. Currently, local authorities have plans to replace Harroun Road bridge at river mile 19.68 and Brint Road bridge at river mile 23.03 along their present alignment. The profiles and flooded area maps and bridge data are based on the existing structures and do not reflect the proposed improvements.

[1] At that time, the stream was called Tenmile Creek from North Maumee Bay to its headwaters. The current name is Ottawa River from North Maumee Bay to the confluence of Tenmile Creek and North Branch Tenmile Creek.

Upstream face of the I-475 Bridge at river mile 16.81 near Sylvania, Ohio

Downstream face of the Sturbridge Road Bridge at river mile 17.65 near Sylvania, Ohio

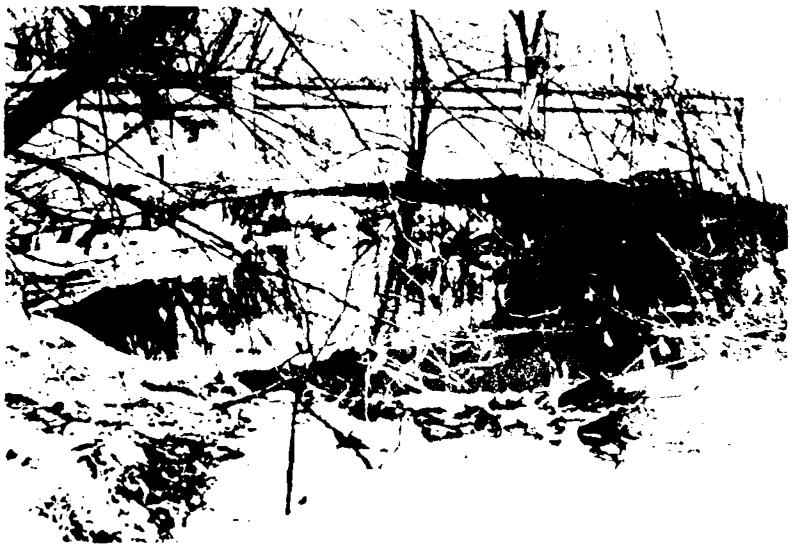
**FIGURE 1 - OTTAWA RIVER BRIDGES**

Downstream face of the South Main Street Bridge at river mile 20.15 in Sylvania, Ohio

Downstream face of the Penn Central Railroad Bridge at River mile 20.24 in Sylvania, Ohio

**FIGURE 2 - TENMILE CREEK BRIDGES**

Upstream face of the Silica Drive Bridge at river mile 20.43 in Sylvania, Ohio



Downstream face of the Kilburn Road Bridge at river mile 29.20 near Sylvania, Ohio

**FIGURE 2 - TENMILE CREEK BRIDGES (continued)**

The location of each of these 27 bridges is shown on the profiles at the end of the report. The sharp drop or "stair step" effect is the result of encroachment by the bridges and their roadway embankments across the flood plain. The magnitude of this drop is an indication of the ability or inability of the structure to pass the flood discharges under consideration. The absence of these structures would have resulted in a relatively smooth sloping line for each flood.

The elevations on the profiles have been translated into flooded areas on Plates 3 through 8. Upstream of each bridge, the outline of the flooded area fans out as a result of the restriction to flow. The degree to which this fanning out takes place depends a great deal upon both the topography and the magnitude of the drop shown on the profiles at each bridge.

No other significant structural obstructions to flood flow are located within the study reach. The profiles and flooded areas are predicated upon bridge openings remaining free of obstructions. However, it is possible for floating material to catch on bridge piers and low steel which would block the waterway openings or clog overbanks in wooded areas. Similarly, in winter months, ice jams in the river could occur which would clog the channels and bridge openings. Both of these events would tend to raise the flood elevations above that shown in the profiles, thus exaggerating the drop in the profiles and the fanning out of the flooded areas.

**Flood damage prevention measures** - Executive Order 11296 requires that all federal agencies directly responsible for the construction of federal facilities, evaluate flood hazards when planning the location of new facilities. In addition, this order requires the federal agencies responsible for administering federal grants, loans or mortgage insurance programs evaluate flood hazards in order to minimize potential flood damage and the need for possible future federal expenditures for flood protection and flood disaster relief.

The Ohio Department of Natural Resources in concert with the Corps of Engineers has developed flood plain management criteria defining the minimum requirements for an effective regulatory program. These are consistent with the requirements of the National Flood Insurance Program and Federal Executive Order 11296 for other federal programs and agencies. State agencies are required to comply with such criteria which discourage the location of structures in the floodway, as well as prescribed limitations when developing in the floodway fringe.

As state coordinating agency, the Department of Natural Resources also participates in the flood plain management activities with other agencies of the federal government other than the Corps of Engineers. In that capacity, it administers the National Flood Insurance and Federal Open Space Grants programs which have application to flood plain management objectives.

In Ohio, the power to adopt and enforce zoning regulations is delegated to political subdivisions. The enabling statutes are within Chapters 303, 519, and 713 of the Ohio Revised Code.

In the City of Sylvania, Ordinance No. 31-74 was passed on June 17, 1974. This ordinance requires that prior to construction or subdivision a permit be obtained from the Local Flood Plain Administrator. The administrator is responsible for reviewing permit applications to assure compliance with the following provisions of the ordinances:

*"2.31 Permit Applications for New Construction or Substantial Improvement to Existing Structures. Permit applications for new or substantial improvement construction (including prefabricated and mobile homes) within Special Flood Hazard Areas shall be reviewed to assure that the proposed construction (a) is protected against flood damage, (b) is designed and anchored to prevent flotation, collapse, or lateral movement of the structure, (c) uses construction materials and utility equipment that are resistant to flood damage, and (d) uses construction methods and prectices that will minimize flood damage.*

*"2.32 Subdivision Proposals and Other New Development Applications. Subdivision and other new development proposals located within the identified Special Flood Hazard Areas shall be reviewed to assure that (a) all such proposals are consistent with the need to minimize flood damage, (b) all public utilities and facilities such as sewer, gas, electrical, and water systems are located, elevated, and constructed to minimize or eliminate flood damage, and (c) adequate drainage is provided so as to reduce exposure to flood hazards.*

*"2.33 New or Replacement Water Supply and Sanitary Sewage System Applications. Applications for new or replacement water supply and sanitary sewer systems located within identified Special Flood Hazard Areas shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters. On-site waste disposal systems shall be located so as to avoid impairment of them or contamination from them during flooding."*

**Flood warning and forecasting service** - Although flood forecasts are not made for the Ottawa River, the study limits are well within the range of the weather surveillance radar at Detroit. The Toledo weather service office issues local flash flood warnings for areas of heavy precipitation by teletype. Subscribers to the teletype service can then relay this information to the local citizens.

# PAST FLOODS

## Flood Records

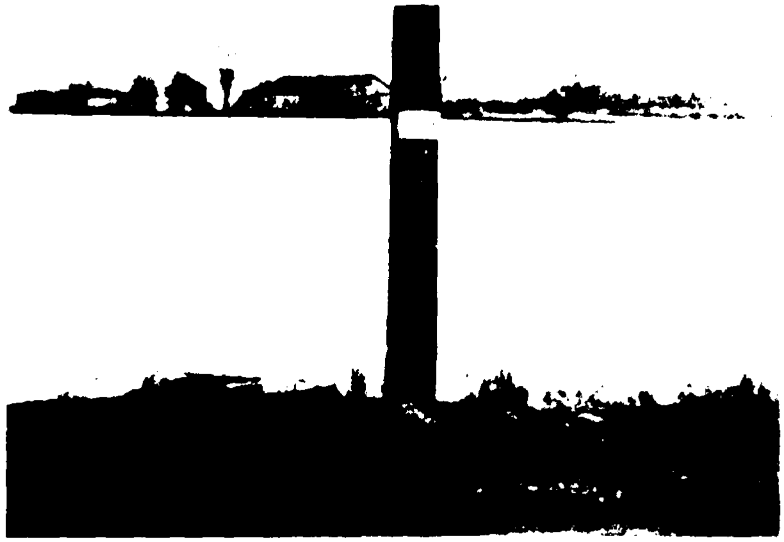
There are no stream gaging stations within the study area on either the Ottawa River or Tenmile Creek from which information on past floods could be extracted. A record of high water marks, however, has been obtained from the Lucas County Engineer which gives some perspective to the magnitude of past floods. The elevations of these high water marks are shown in Table 2. In addition, newspaper files have been searched for information concerning past floods.

## Flood Descriptions

Although floods of varying magnitude have occurred on the Ottawa River and Tenmile Creek, they have caused little damage. This can be attributed to the little development in the flood plains. In July, 1958, a summer storm caused flooding of agricultural lands in the study area. Pictures of this flood are shown on Figure 3 and on the cover sheet.

The Sentinel Herald briefly described the flood of February 10, 1959. Whitt's Inn, which used to be located on North Main Street, had two feet of water running in and out the doors. Carroll Motor Sales, located at the foot of South Main Street hill, also had two feet of water in the basement.

The Sylvania Sentinel indicated that the Sylvania area was spared major flooding by the July 4, 1969 storm. Photographs in the paper showed flooding over Harroun Road near Tenmile Creek.



Flooded farmland at the corner of Sylvania Avenue and Mitchaw Road looking north from Sylvania Avenue

Flooded farmland at the corner of Holt Road and Mitchaw Road

**FIGURE 3 - FLOOD SCENES IN SYLVANIA TOWNSHIP,**
July 15, 1958

## TABLE 2

## HIGH WATER MARKS

| Bridge Identifications | Miles Above Mouth of Ottawa River | 1973 Flood | Elevation, feet (Lucas County Datum)[1] May 7, 1933 Flood | February 10, 1959 Flood | 1961 Flood | Other Floods |
|---|---|---|---|---|---|---|
| | | | OTTAWA RIVER | | | |
| Sylvania Avenue | 16.91 | 607.15 | 603.48 | 602.91 | 602.50 | |
| Sturbridge Road | 17.65 | | | | | 606.70[2] |
| Harroun Road | 19.68 | 624.70 | 622.60 | 622.42 | 621.70 | |
| | | | TENMILE CREEK | | | |
| Silica Drive | 20.43 | 632.28 | 634.61 | | 633.80 | |
| Brint Road | 23.03 | 655.70 | 655.30 | 655.16 | 653.90 | 654.70[3] |
| Sylvania Avenue | 24.21 | 661.20 | 659.18 | 658.18 | 658.30 | 658.87[3] |
| Centennial Road | 25.17 | 663.26 | 662.60 | 662.77 | 662.3 | |
| Herr Road | 25.98 | 668.71 | 667.99 | 666.66 | | 665.86[4] |
| Sylvania Avenue | 26.88 | 672.34 | 670.72 | 669.08 | 669.9 | |
| Brint Road | 28.50 | 680.20 | 678.72 | 678.46 | 676.4 | |
| Sylvania Metamora Road | 29.95 | 687.04 | 684.90 | 685.16 | 684.3 | |

[1] County datum minus 0.492 feet equals U.S. Geological Survey datum

[2] 1966

[3] July 4, 1969

[4] 1944

## FUTURE FLOODS

Large floods have been experienced in the past over watersheds of other streams in the general geographic and physiographic region of this study. Intense storms similar to those causing these floods could occur over the Ottawa River watershed. It is therefore, desirable in determining future floods for this study area to consider storms and floods that have occurred in the region over watersheds whose topography, watershed cover, and physical characteristics are similar.

Information of this nature has been collected and complied in Bulletin 43[1] for streams in Ohio. Procedures described in this publication were used in determining the appropriate discharge rates for the various flood frequencies under consideration.

### 50-Year Frequency Flood

The 50 year frequency flood has a 2 percent chance of occurring in any given year. Since the flood represented by this frequency is statistically a more common event than either the Intermediate Regional Flood or Standard Project Floods, the magnitude of its flood flows as shown in Table 3 is less. Under the physiographic features of this watershed, the 50 year frequency flood flows represent about 86 percent of the Intermediate Regional Flood flows. The profiles at the end of the report illustrate the elevation to which each of the floods examined is expected to reach in relation to the stream bed and top of low bank elevations. Also shown on these profiles are the location of bridges and surveyed cross sections. This information can be used to better locate problem areas of particular interest.

### Intermediate Regional Flood

The Intermediate Regional Flood is defined as a flood having an average frequency of probability of occurrence of once in 100 years or a flood that has a 1 percent chance of happening in any one year at a designated location. This is a major flood, although considerably less severe than the Standard Project Flood. Within the study area, flows representing the Intermediate Regional Flood are about 33 percent of the Standard Project Flood. The profiles and areas flooded by the Intermediate Regional Flood are shown at the end of the report.

### Standard Project Flood

Only in rare instances has a specific stream experienced the largest flood that is likely to occur. Severe as the maximum known flood may have been on any given stream, it is commonly agreed that a larger flood can occur. The Corps of Engineers, in cooperation with the National Weather Service, has made comprehensive studies and investigations based on records of experienced storms and floods. With these, a generalized procedure for estimating flood potential has been developed and used in determining the Standard Project Flood. It is defined as the largest flood that can be expected from the most severe combination of meterological and hydrological conditions that is considered reasonably characteristic of the geographical region involved. It represents a reasonable upper limit of flooding. It is not practical to assign a frequency to the Standard Project Flood because of the somewhat limited data available. The magnitude of the Standard Project Flood represents a recurrence interval well in excess of the Intermediate Regional Flood. The profile and areas flooded by the Standard Project Flood are shown at the end of the report.

[1] "Floods in Ohio, Magnitude and Frequency, a supplement to Bulletin 32," by U. S. Geological Survey in cooperation with the Division of Water, Ohio Department of Natural Resources, April 1969

TABLE 3

PEAK FLOWS

| Location | Miles Above Mouth of Ottawa River | Drainage Area, sq. mi. | Flood Discharge, cfs 50-Year Frequency Flood | Intermediate Regional Flood | Standard Project Flood |
|---|---|---|---|---|---|
| | | **OTTAWA RIVER** | | | |
| Downstream Study Limit | 16.81 | 125.37 | 5,300 | 6,000 | 19,000 |
| Above Harroun Ditch | 17.70 | 122.41 | 5,000 | 5,750 | 18,000 |
| | | **TENMILE CREEK** | | | |
| At Mouth | 19.95 | 80.7 | 3,900 | 4,450 | 13,700 |
| Above Schreiber Ditch | 21.98 | 73.21 | 3,600 | 4,200 | 12,800 |
| Above Comstock and Sharp Ditch | 24.23 | 67.04 | 3,350 | 3,850 | 11,700 |
| Above Prairie Ditch | 26.10 | 46.8 | 2,700 | 3,100 | 9,500 |
| Above Butler Ditch | 27.88 | 41.36 | 2,500 | 2,900 | 8,700 |
| Above Roberts Ditch | 30.30 | 33.91 | 2,250 | 2,650 | 7,900 |
| Upstream Study Limit | 30.90 | 35.55 | 2,250 | 2,650 | 7,900 |

Comparison of the peak discharges expressed in cubic feet per second, shown in Table 3 indicates that the Standard Project Flood flows are over three times as great as the Intermediate Regional Flood flows. Computed profile elevations of the Intermediate Regional and Standard Project Floods are compared with bridge elevations in Table 4.

**Hazards of Large Floods**

The amount and extent of damage caused by a flood depends, in general, upon the extent of development in the area flooded, the depth of flooding, the velocity of flow, the rate of rise, and the duration of flooding. Deep floodwater flowing at high velocity and carrying floating debris could create conditions hazardous to persons and vehicles attempting to cross flooded areas. In general, floodwater 3 feet deep or more and flowing at a velocity of 3 feet per second or more could easily sweep an adult person off his feet, thus creating definite danger of injury or drowning. Water lines can be ruptured by being exposed due to the erosive action of floodwater, thus creating the possibility of contaminated domestic water supplies. Inundation of roadways can flood sanitary sewers, causing sewage to back up into basements. Extended periods of flooding not only create severe hardships for residents and businesses, but also post flood structural and sanitary problems. Swelling, warping, and settling of buildings and the widespread distribution of pollution-laden debris and silt confront all affected residents. Isolation of areas by floodwater could create hazards in terms of medical, fire, or law enforcement emergencies.

**Flooded areas and flood damage** - The areas that would be flooded by the Intermediate Regional and Standard Project Floods are shown on Plates 3 through 8. The flooded outlines along the tributaries upstream of their confluence with the main stem represent the dead level backwater flood elevation from the main stem river and do not reflect peak runoff conditions of the tributaries themselves. Actual limits of the flooded area on the ground may differ from that shown, as the 5 foot contour interval and map scale do not permit precise plotting of boundaries.

**Obstructions** - Twenty seven bridges span Ottawa River and Tenmile Creek within the study reach. Of the eight across the Ottawa River, six are public and two are private. The remaining 19 cross Tenmile Creek and consist of 13 public roads, 2 railroads, and 4 private roads. No other significant structural obstructions to flood flows are located within the study reach. As indicated under the discussion on Factors Affecting Flooding and Its Impact, waterway openings of bridges may become clogged, thus increasing flood elevations. Since it is impossible to forecast these events, it was assumed for these flood determinations that all bridge structures would stand and that no clogging would occur.

**Velocities of flow** - Water velocities during floods depend largely upon the size and shape of the cross sections, the condition of the stream, and the stream bed slope, all of which vary on different streams and at different locations on the same stream. During an Intermediate Regional Flood, velocities in the main channel would range from 0.8 to 14.3 feet per second. Overbank velocities would generally be less than 1.5 feet per second, but would reach 3.4 feet per second. Channel velocities during the Standard Project Flood would range from 1.1 to 19.95 feet per second. Overbank velocities would generally be less than 2 feet per second, but would reach 4.4 feet per second. The dangers encountered as a result of high velocities are described under the section, Hazards of Large Floods.

**Photographs of design flood heights** - Intermediate Regional and Standard Project Flood levels reached at various locations in the study area are indicated on Figures 4 and 5.

## TABLE 4

## ELEVATION DATA

## BRIDGES ACROSS OTTAWA RIVER AND TENMILE CREEK IN SYLVANIA AND VICINITY, LUCAS COUNTY, OHIO

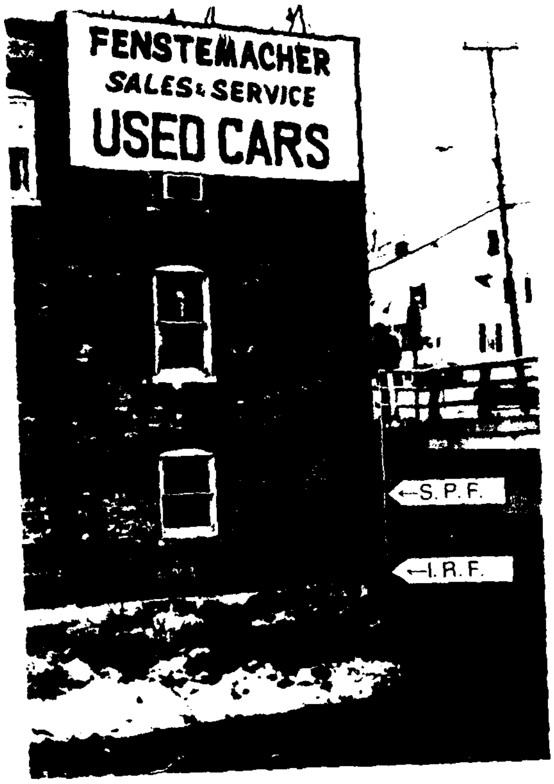
| Bridge Identification | River Mile, Above Mouth of Ottawa River | Elevation, feet (U.S.G.S. Datum): Stream Bed[1] | Low Steel[2] | Bridge Floor[2] | Intermediate[3] Regional Flood | Standard[3] Project Flood |
|---|---|---|---|---|---|---|
| **OTTAWA RIVER** | | | | | | |
| Interstate 475 | 16.81 | 594.7 | 613.3 | 617.3 | 607.37 | 617.13 |
| Sylvania Avenue | 16.91 | 593.2 | 607.6 | 611.9 | 608.05 | 616.13 |
| Sturbridge Road | 17.65 | 597.8 | 612.7 | 614.6 | 608.61 | 618.33 |
| Private Road | 18.01 | 600.3 | 609.5 | 611.3 | 611.60 | 619.22 |
| Private Road | 18.73 | 605.9 | 614.5 | 616.5 | 615.92 | 622.17 |
| U.S. 23 N. Exit Ramp | 19.23 | 609.4 | 628.6 | 630.1 | 618.64 | 626.63 |
| U.S. 23 | 19.28 | 610.2 | 627.0 | 629.3 | 619.63 | 631.03 |
| Harroun Road | 19.68 | 613.6 | 627.2 | 630.4 | 623.42 | 631.60 |
| **TENMILE CREEK** | | | | | | |
| South Main Street | 20.15 | 623.3 | 633.3 | 638.1 | 630.57 | 639.81 |
| Penn Central Railroad | 20.24 | 624.8 | 647.2[4] | 653.1 | 633.10 | 640.14 |
| Silica Drive | 20.43 | 628.2 | 638.2[4] | 643.9 | 637.78 | 647.90 |
| Olde Post Road | 21.02 | 635.6 | 645.4 | 648.6 | 644.68 | 650.90 |
| Private Road | 21.24 | 637.2 | 643.4 | 646.4 | 648.96 | 653.31 |
| Bonniebrook Road | 21.84 | 642.2 | 653.7 | 655.3 | 651.39 | 657.05 |
| Private Road | 22.24 | 643.3 | 650.8 | 652.6 | 654.56 | 659.97 |
| Brint Road | 23.03 | 645.2 | 657.0 | 659.0 | 657.83 | 662.14 |
| Sylvania Avenue | 24.21 | 649.8 | 660.8 | 663.1 | 660.46 | 663.97 |
| Toledo Angola & Western R.R. | 24.55 | 650.6 | 663.1 | 666.9 | 663.92 | 668.55 |
| Centennial Road | 25.17 | 652.2 | 666.6 | 670.5 | 665.00 | 670.12 |
| Private Road | 25.55 | 653.4 | 664.2 | 665.6 | 666.40 | 670.26 |
| Herr Road | 25.98 | 654.6 | 668.8 | 670.4 | 667.25 | 670.78 |
| Sylvania Avenue | 26.88 | 659.5 | 672.5 | 674.4 | 669.47 | 674.58 |
| Brint Road | 28.50 | 670.0 | 680.5 | 683.1 | 677.64 | 681.17 |
| Private Road | 28.72 | 671.3 | 678.6 | 680.6 | 679.61 | 681.64 |
| Kilburn Road | 29.20 | 673.4 | 682.1[4] | 684.6 | 683.75 | 685.12 |
| Sylvania Metamora Road | 29.95 | 675.8 | 688.0[4] | 690.5 | 685.52 | 690.61 |
| Gibbs Road | 30.38 | 678.2 | 687.2 | 689.8 | 686.81 | 691.36 |

[1] Elevation at lowpoint in channel
[2] Elevation at center of bridge
[3] Elevation at upstream face of bridge
[4] Elevation at top of arch


Sturbridge Road Bridge at river mile 17.65.


Sylvania Sewage Treatment Plant at river mile 19.86.

**FIGURE 4 - FLOOD HEIGHTS ALONG OTTAWA RIVER**




Commercial building on Main Street at river mile 20.15.

Residential development along Apple Creek Road at river mile 20.74. This area would not be inundated by the IRF.


**FIGURE 5 - FLOOD HEIGHTS ALONG TENMILE CREEK**


Olde Post Road Bridge at river mile 21.02.

Brint Road Bridge at river mile 23.03.


**FIGURE 6** - FLOOD HEIGHTS ALONG TENMILE CREEK (Continued)

## GLOSSARY

**Backwater.** The resulting highwater surface upstream from a dam, bridge or other obstruction in a river channel. Also, the body of relatively still waters in tributaries or low lying areas having access to the main body of water.

**Channel or Watercourse.** An elongated depression either natural or man made having a bed and well defined banks varying in depth, width, and length, which gives direction to a current of water and is normally described as a creek, stream, or river bed.

**Cross-section.** A section taken transverse or at right angles to the axis of the channel showing the depth of the channel relative to the channel banks and higher ground.

**Datum.** An assumed reference plane from which elevations and depths are measured, such as from sea level.

**Flood.** A temporary overflow by a river, stream, ocean, lake, or other body of water of lands not normally covered by water. It does not include the ponding of surface water due to inadequate drainage, such as within a development. It is characterized by damaging inundation, backwater effects of surcharging sewers and local drainage channels, and by unsanitary conditions within adjoining flooded habitated area attributable to pollutants, debris, and water table.

***Flood Crest.*** The maximum stage or elevation reached by flood waters at a given location.

**Flood Peak.** The maximum instantaneous discharge or volume of flow in cubic feet per second passing a given location. It usually occurs at or near the time of the flood crest.

**Flood Plain.** The relatively flat area or low lands covered by flood waters originating with either the adjoining channel of a water course, such as a river or stream, or a body of standing water, such as an ocean or lake.

**Flood Profile.** A graph showing the relationship of water surface elevation to location along the stream. The latter is generally expressed as distance above the mouth of the stream in miles. While it is drawn to show surface elevations for the crest of a specific flood, it may be prepared for conditions at any other given time or stage.

**Flood Stage.** The elevation at which overflow of the natural stream banks or body of water occurs.

**Frequency.** The expected recurrence interval for a given size flood based upon long term statistical probability. Large floods are less frequent and smaller floods are more frequent.

**Gage.** An instrument installed upstream from, but within range of the cross section or reach of the river in question to determine fluctuations and stage with respect to time.

**Head Loss.** The effect of obstructions, such as narrow bridge openings, dams or buildings that limit the area through which water must flow, raising the surface of water upstream from the obstruction.

**Headwater.** The tributaries which are the sources of streams.

**Hydrograph.** A graph denoting the discharge or stage of flow over a period of time.

**Intermediate Regional Flood.** A flood having an average frequency of occurrence in the order of once in 100 years, although the flood may occur in any year. It is based on statistical analysis of stream flow records available for the watershed and analysis of rainfall and runoff characteristics in the general region of the watershed.

**Left Bank.** The bank of the left side of a river, stream or watercourse, looking downstream.

**Low Steel (or Underclearance).** See "Underclearance."

**Right Bank.** The bank on the right side of the river, stream or watercourse, looking downstream.

**Standard Project Flood.** The flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for these floods are generally about 40 percent to 60 percent of the Probable Maximum Floods for the same basins. Such floods, as used by the Corps of Engineers, are intended as practical expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

**Underclearance.** The lowest point of a bridge or other structure over or across a river, stream, or watercourse that limits the opening through which water flows. This is referred to as "low steel" in some regions.

**Watershed.** The area drained by a river or river system. The terms "drainage basin" and "watershed" are synonymous.

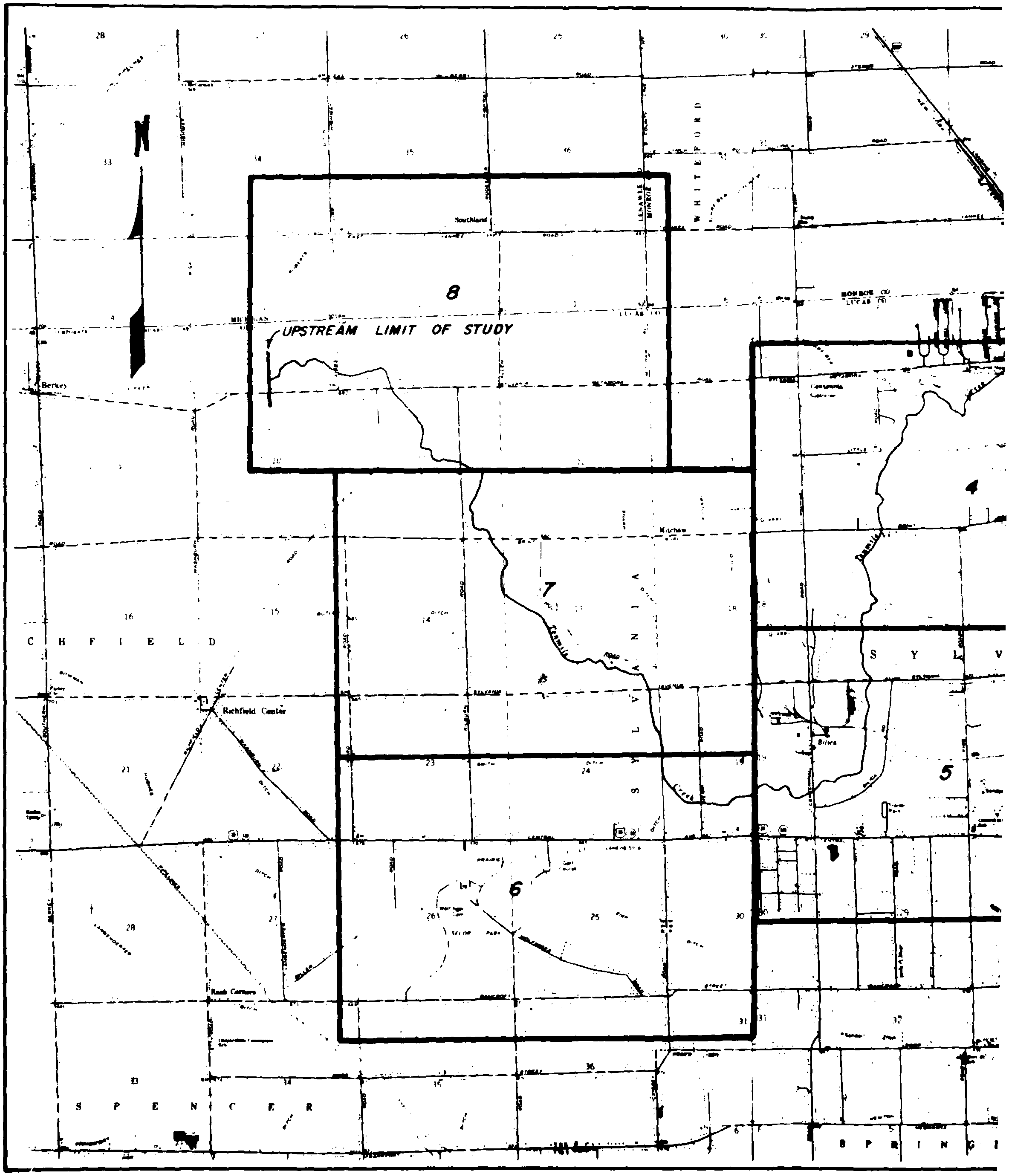
**Water-stage Recorder.** A device for producing, graphically or otherwise, a record of the rise and fall of a water surface with respect to time.

**Wire-weight Gage.** A river gage in which a weight suspended on wire is lowered to the water surface from an overhead structure, to measure the distance from a point of known elevation on the structure to the water surface.

## AUTHORITY AND ACKNOWLEDGMENTS

This report has been prepared by Burgess & Niple, Limited under the direction of the Detroit District of the U.S. Army Corps of Engineers in accordance with the authority granted by Section 206 of the Flood Control Act of 1960 (PL 86-465) as amended.

Assistance and cooperation of federal, state, and local agencies in supplying useful information are appreciated. Pictures of the July 15, 1958 flood were provided by Mr. Zeno Langenderfer.


UPSTREAM LIMIT OF STUDY
8
7
6
5
4
Southland
Berkey
Mitchaw
Richfield Center
Raab Corners
Centennial
Silica
MONROE CO
LUCAS CO
W H I T E F O R D
S Y L V A N I A
C H F I E L D
S P E N C E R
S Y L V
Tenmile
Creek

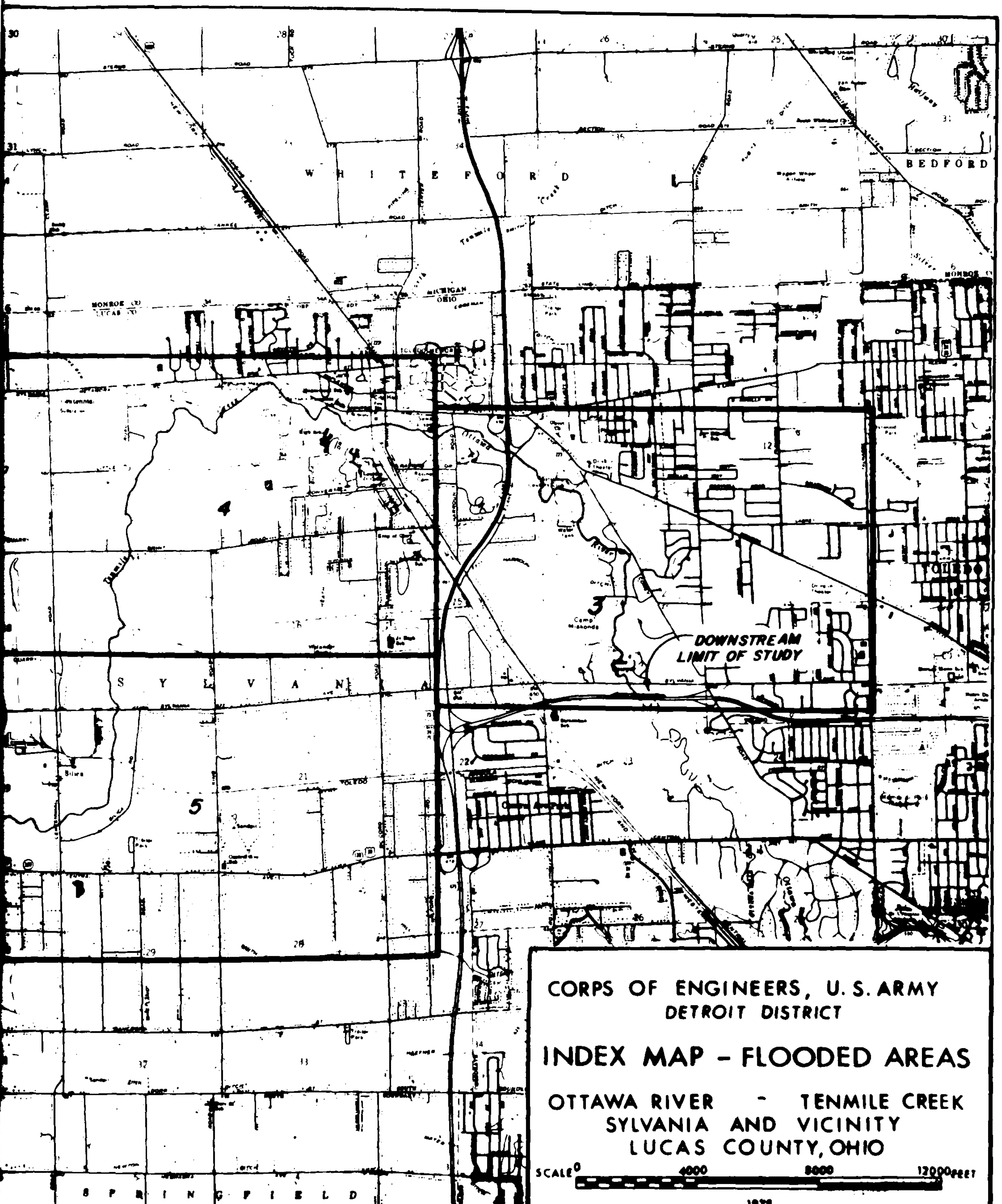
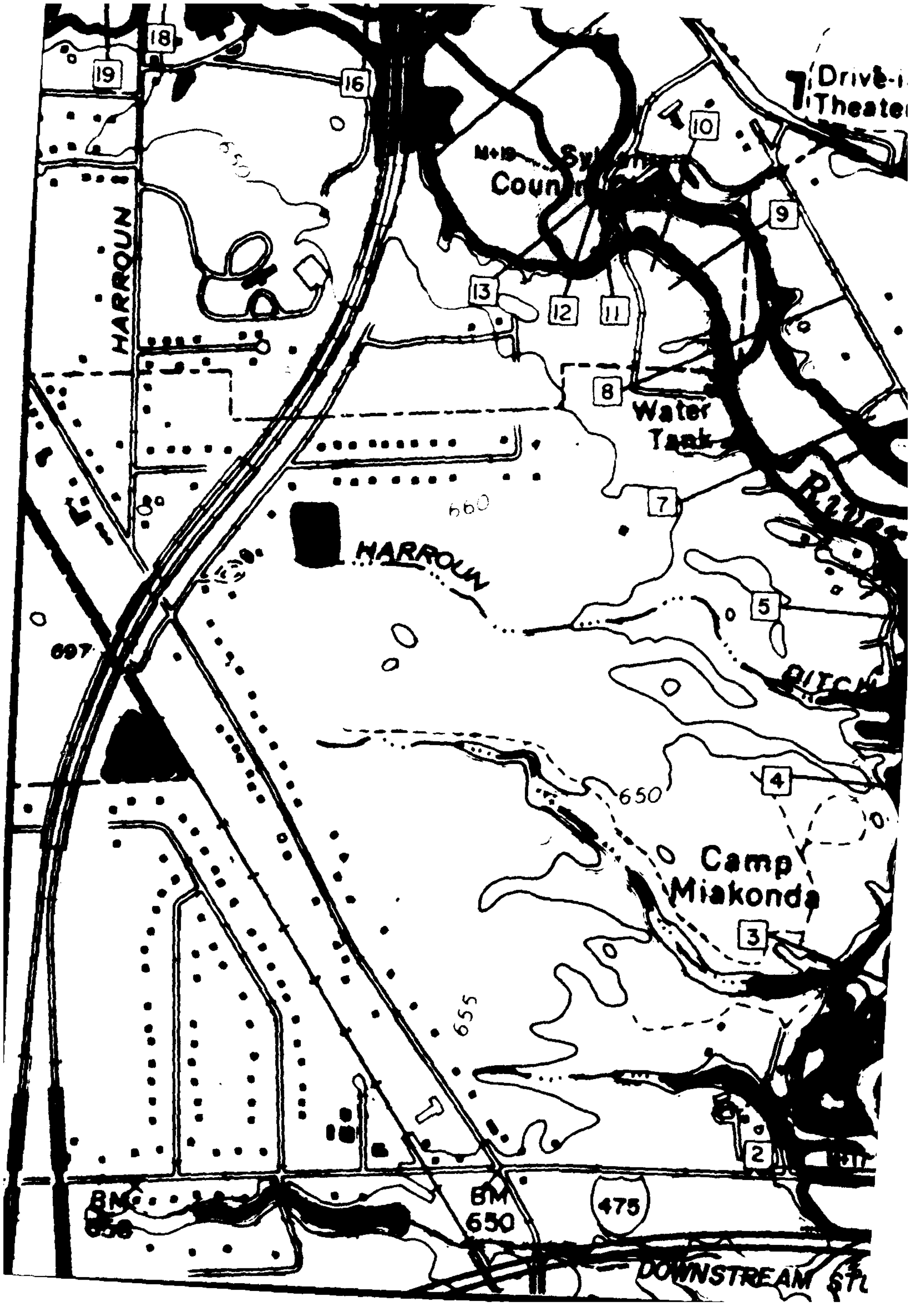

W H I T E F O R D
BEDFORD
S Y L V A N I A
S P R I N G F I E L D
DOWNSTREAM LIMIT OF STUDY
3
4
5
CORPS OF ENGINEERS, U. S. ARMY
DETROIT DISTRICT
INDEX MAP - FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 4000 8000 12000 FEET
1975

PLATE 2



18
19
16
10
Drive-i
Theate
M-19
Sy
Coun
9
HARROUN
13
12
11
8
Water
Tank
7
660
HARROUN
5
697
DITCH
4
650
Camp
Miakonda
3
655
2
BM
650
475
DOWNSTREAM

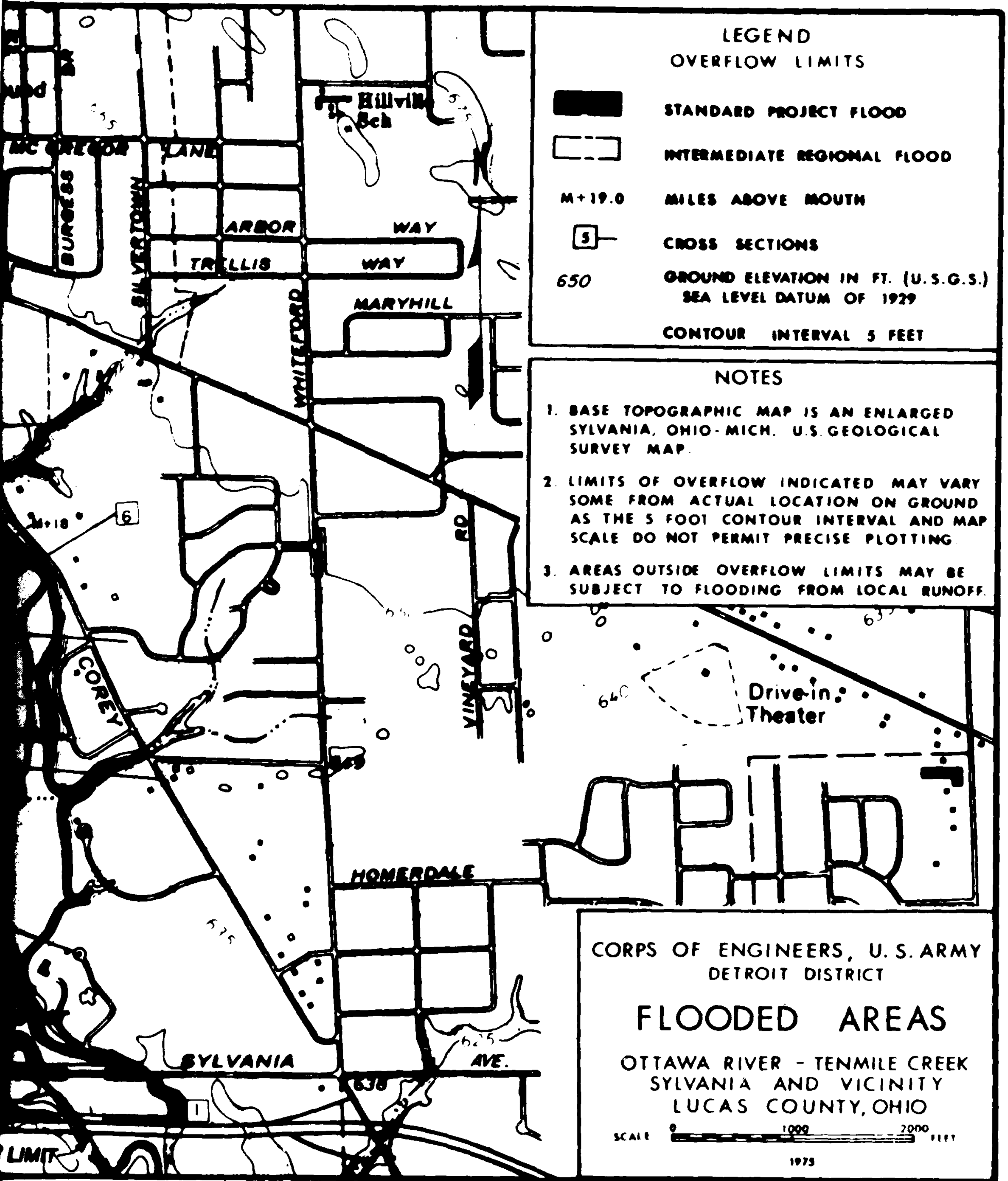

LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M+19.0 MILES ABOVE MOUTH
5 CROSS SECTIONS
650 GROUND ELEVATION IN FT. (U.S.G.S.) SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
NOTES
1. BASE TOPOGRAPHIC MAP IS AN ENLARGED SYLVANIA, OHIO-MICH. U.S. GEOLOGICAL SURVEY MAP.
2. LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATION ON GROUND AS THE 5 FOOT CONTOUR INTERVAL AND MAP SCALE DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
CORPS OF ENGINEERS, U. S. ARMY
DETROIT DISTRICT
FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 1000 2000 FEET
1975
MC GREGOR
LANE
BURGESS
SILVERTOWN
ARBOR
WAY
TRELLIS
WAY
MARYHILL
WHITEFORD
RD
VINEYARD
COREY
HOMERDALE
SYLVANIA
AVE.
Drive-in Theater
M+18
6
1
LIMIT
640
638

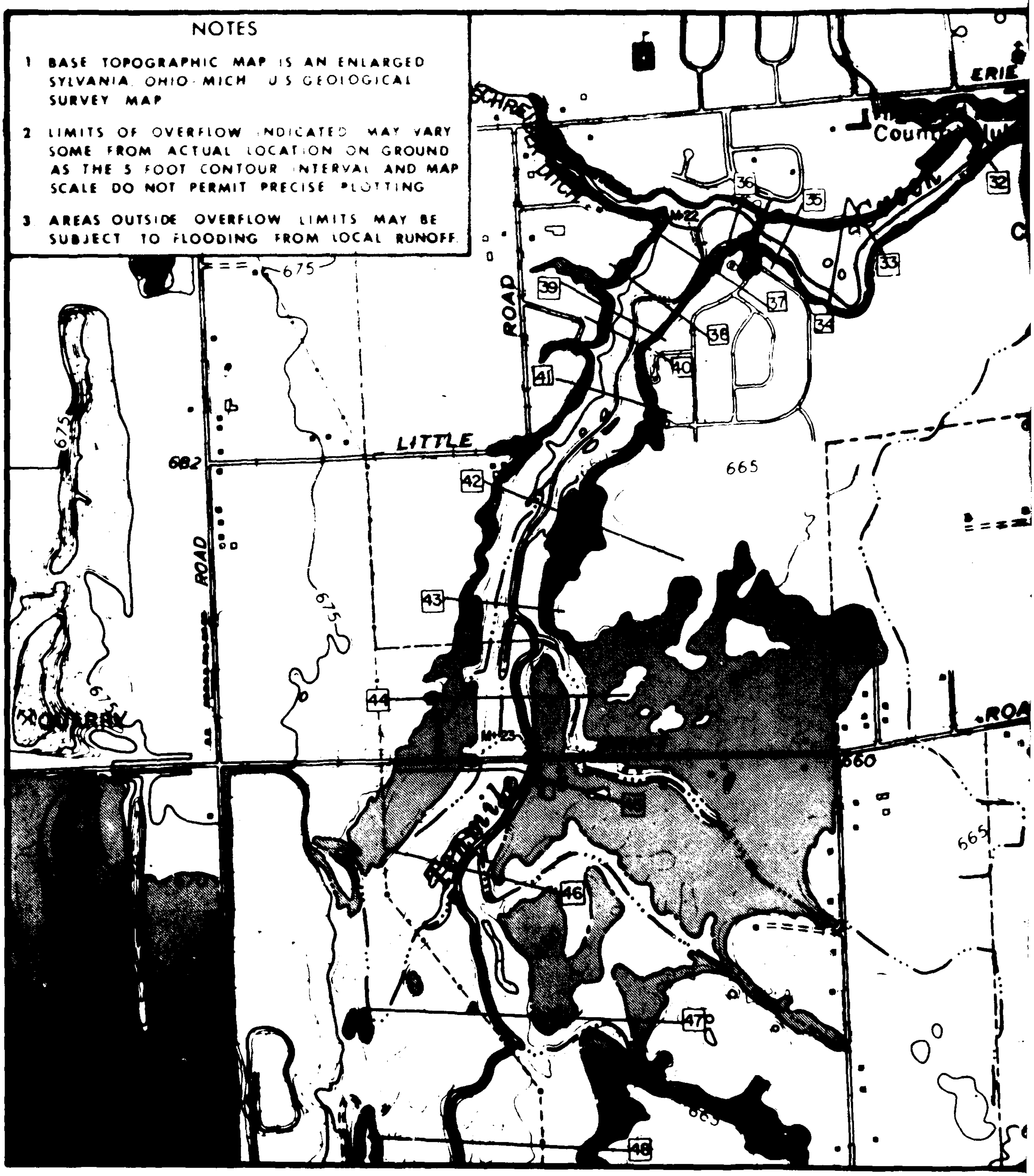
PLATE 3

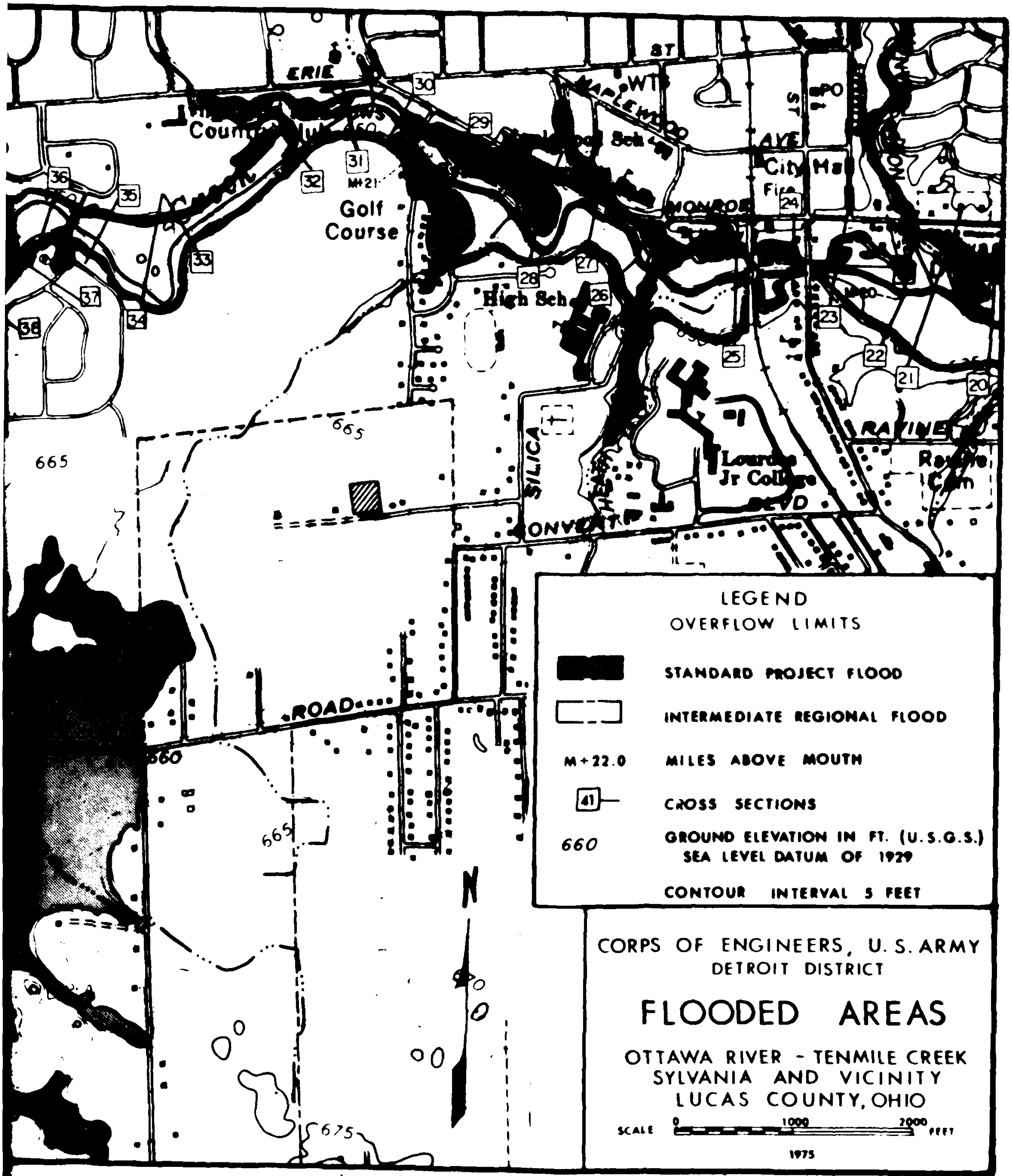
NOTES

1. BASE TOPOGRAPHIC MAP IS AN ENLARGED SYLVANIA, OHIO-MICH. U.S. GEOLOGICAL SURVEY MAP

2. LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATION ON GROUND AS THE 5 FOOT CONTOUR INTERVAL AND MAP SCALE DO NOT PERMIT PRECISE PLOTTING

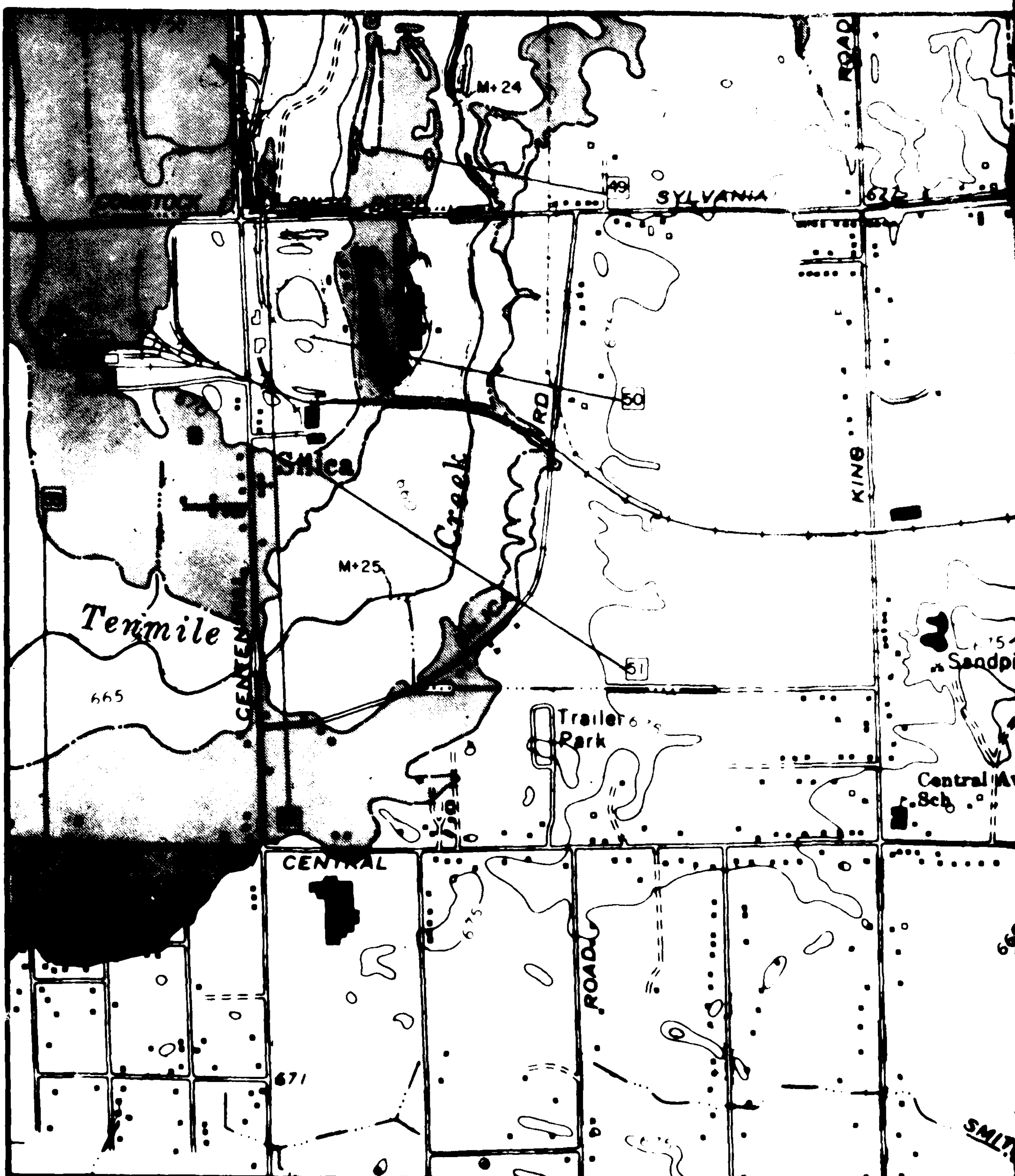
3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

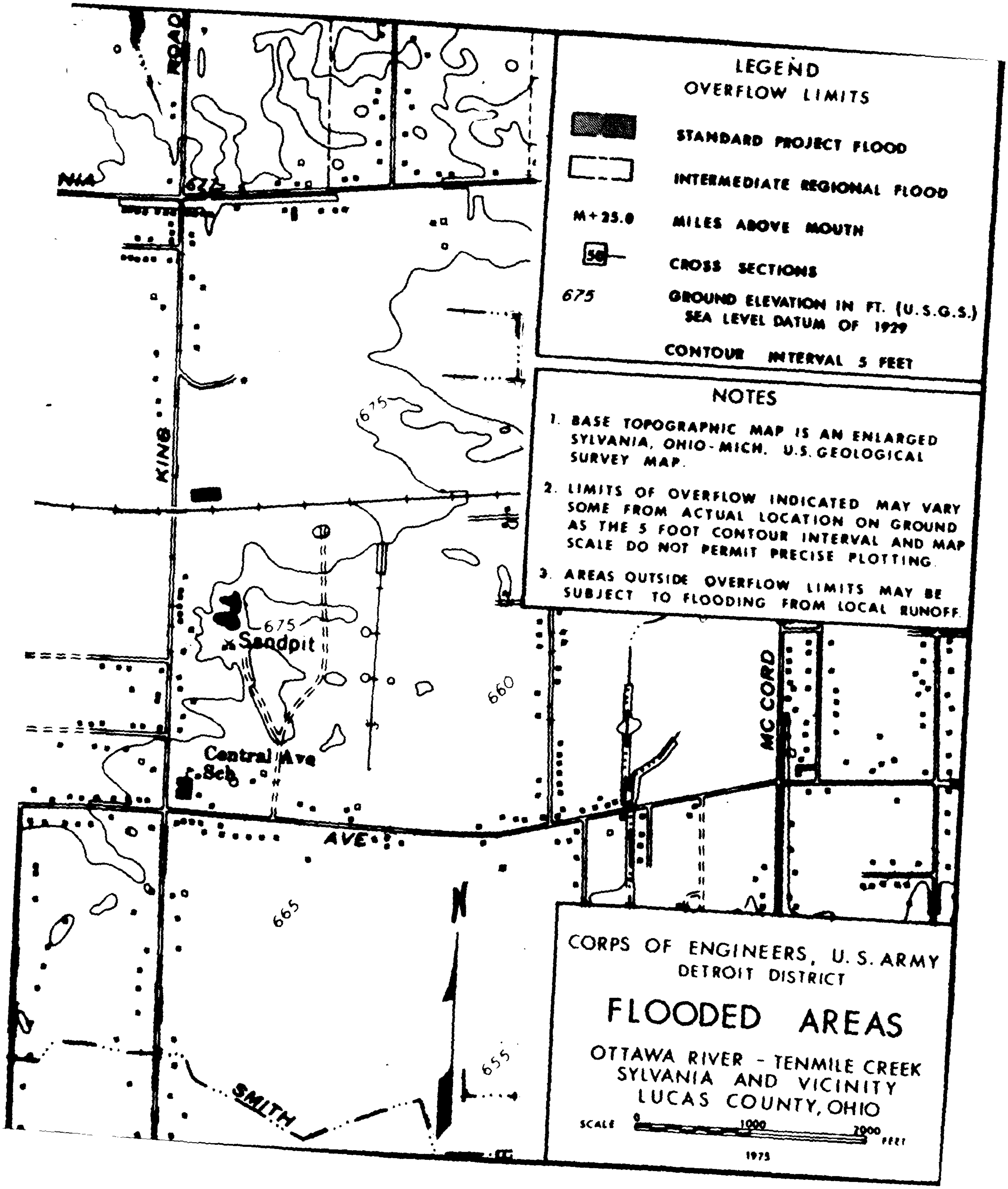


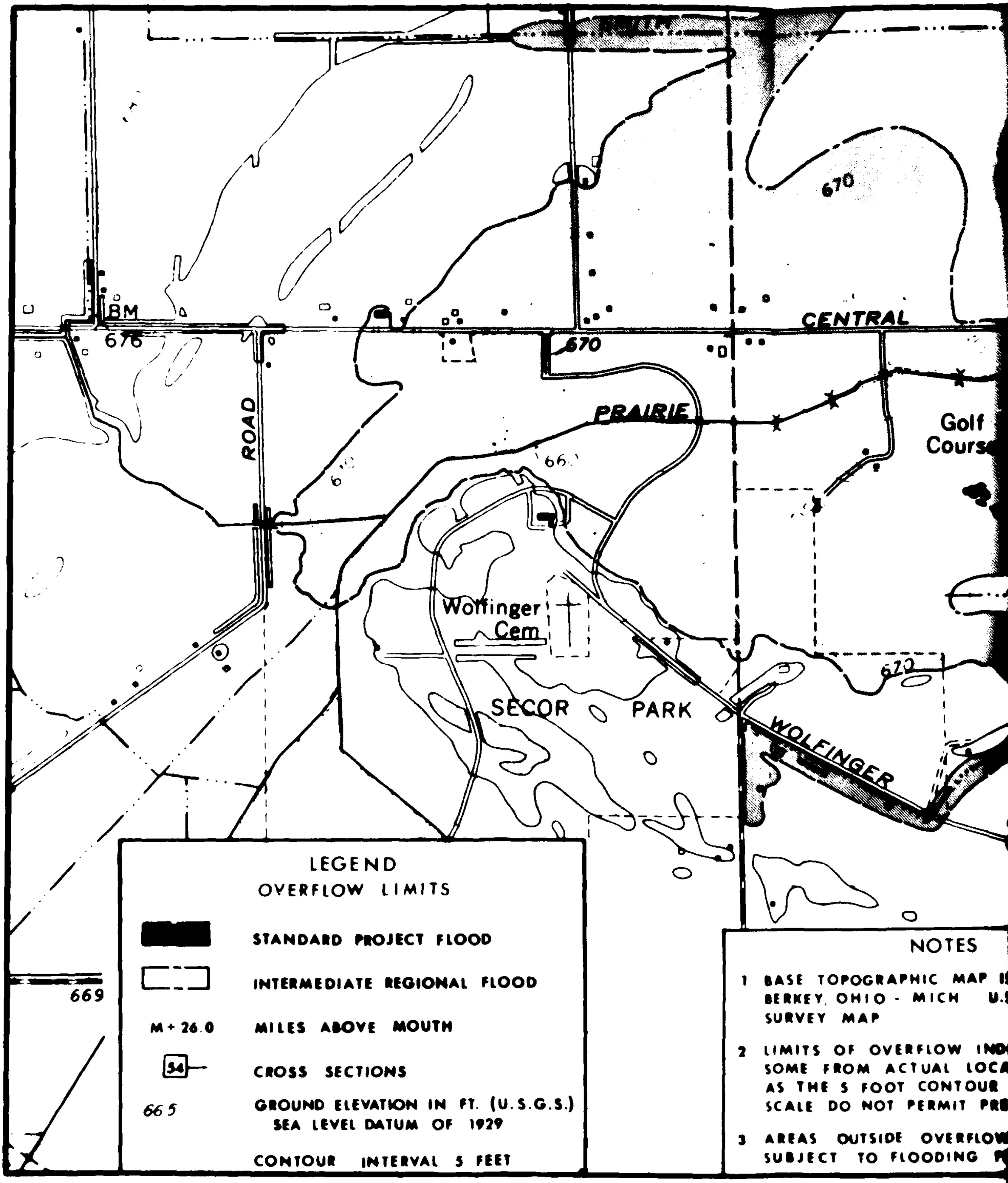


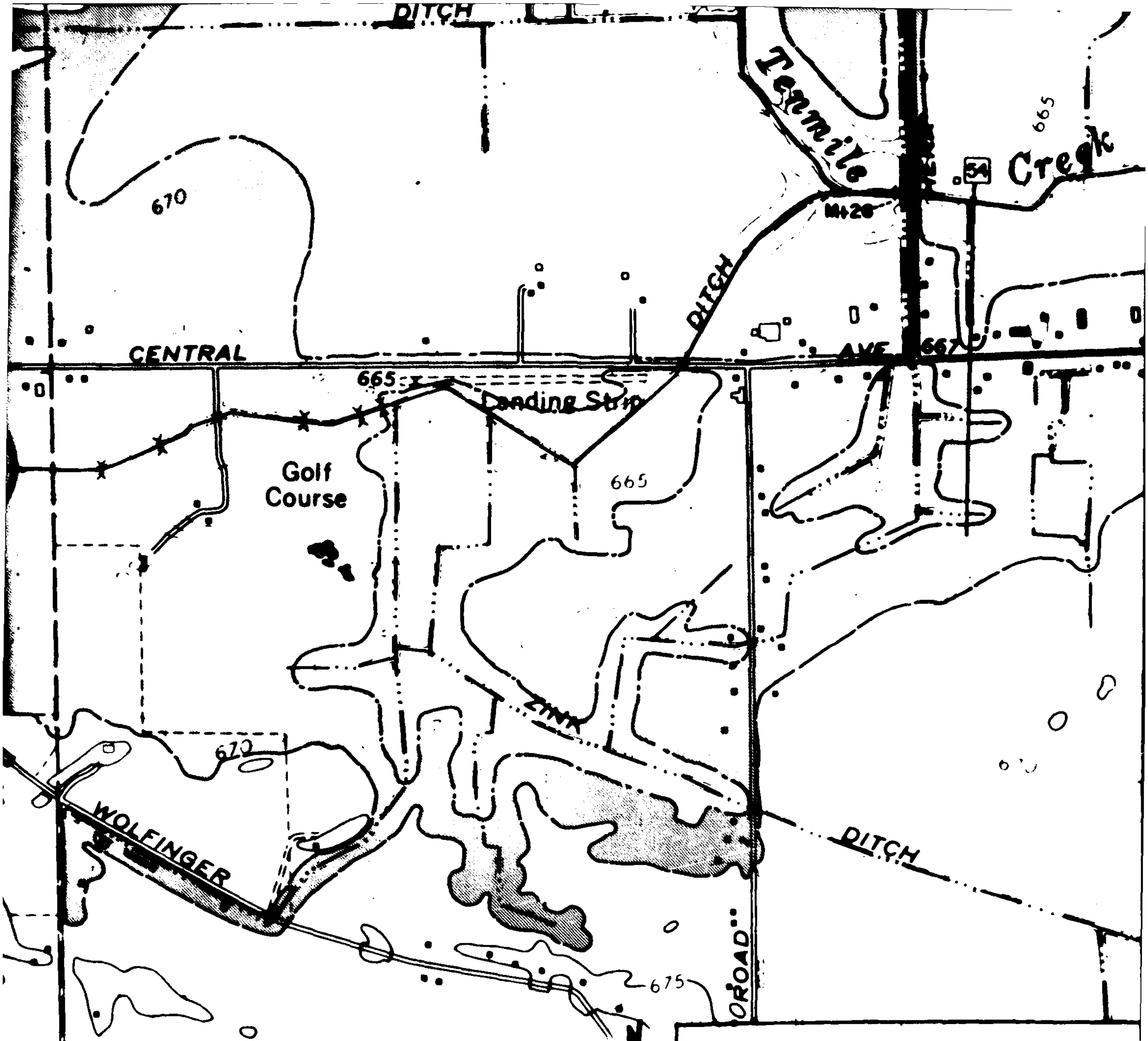
ERIE
ST
30
29
MAPLEWOOD
AVE
City Hall
Fire
24
MONROE
Golf Course
31
M+21
32
33
35
36
37
34
38
28
27
26
High Sch
25
23
22
21
20
RAVINE
Lourdes Jr College
BLVD
SILICA
CONVENT
ROAD
665
665
665
660
675
N
LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M+22.0 MILES ABOVE MOUTH
41 CROSS SECTIONS
660 GROUND ELEVATION IN FT. (U.S.G.S.) SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT
FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 1000 2000 FEET
1975


PLATE 4


M+24
ROAD
SYLVANIA
49
50
RD
Silica
Creek
KING
M+25
Tenmile
CENTER
51
665
Trailer
Park
Sandpit
Central Av
Sch
CENTRAL
675
ROAD
671
SMIT


LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M+25.0 MILES ABOVE MOUTH
58 CROSS SECTIONS
675 GROUND ELEVATION IN FT. (U.S.G.S.) SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
NOTES
1. BASE TOPOGRAPHIC MAP IS AN ENLARGED SYLVANIA, OHIO-MICH. U.S. GEOLOGICAL SURVEY MAP.
2. LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATION ON GROUND AS THE 5 FOOT CONTOUR INTERVAL AND MAP SCALE DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
ROAD
KING
675
Sandpit
660
Central Ave Sch
AVE
665
655
SMITH
MC CORD
N
CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT
FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 1000 2000 FEET
1975


CENTRAL
PRAIRIE
ROAD
BM
676
670
670
670
669
Golf
Wolfinger
Cem
SECOR PARK
WOLFINGER
LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M + 26.0
MILES ABOVE MOUTH
54
CROSS SECTIONS
66 5
GROUND ELEVATION IN FT. (U.S.G.S.)
SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
NOTES
1 BASE TOPOGRAPHIC MAP
BERKEY, OHIO - MICH
SURVEY MAP
2 LIMITS OF OVERFLOW
SOME FROM ACTUAL
AS THE 5 FOOT CONTOUR
SCALE DO NOT PERMIT
3 AREAS OUTSIDE
SUBJECT TO FLOODING




## NOTES

1. BASE TOPOGRAPHIC MAP IS AN ENLARGED BERKEY, OHIO - MICH. U.S. GEOLOGICAL SURVEY MAP
2. LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATION ON GROUND AS THE 5 FOOT CONTOUR INTERVAL AND MAP SCALE DO NOT PERMIT PRECISE PLOTTING
3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

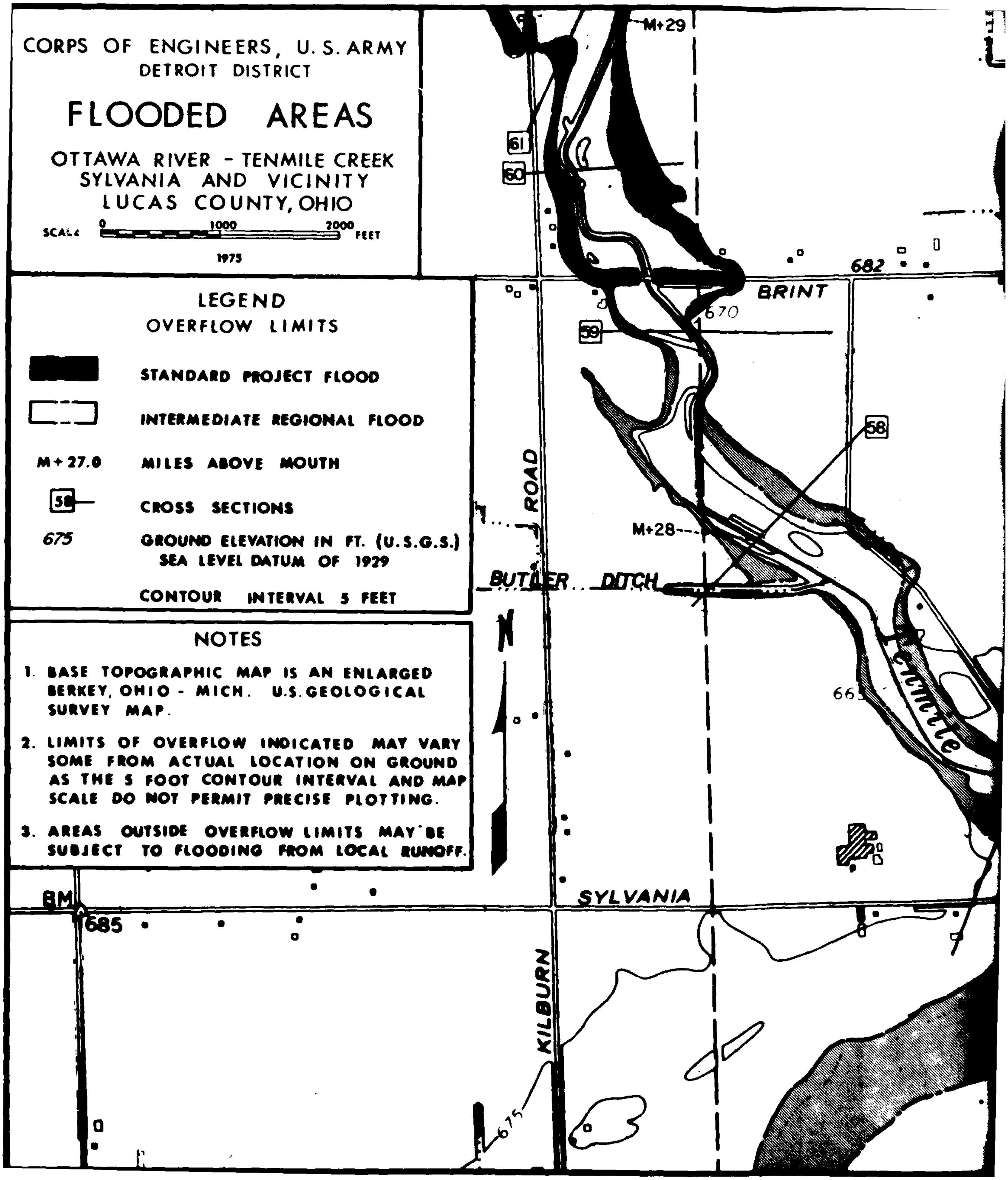
CORPS OF ENGINEERS, U. S. ARMY
DETROIT DISTRICT

# FLOODED AREAS

OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO

SCALE 0 1000 2000 FEET

1975


CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT
FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 1000 2000 FEET
1975
LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M+27.0 MILES ABOVE MOUTH
58 CROSS SECTIONS
675 GROUND ELEVATION IN FT. (U.S.G.S.) SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
NOTES
1. BASE TOPOGRAPHIC MAP IS AN ENLARGED BERKEY, OHIO - MICH. U.S. GEOLOGICAL SURVEY MAP.
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3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
M+29
61
60
59
58
682
BRINT
670
ROAD
M+28
BUTLER DITCH
N
665
SYLVANIA
BM
685
KILBURN
675

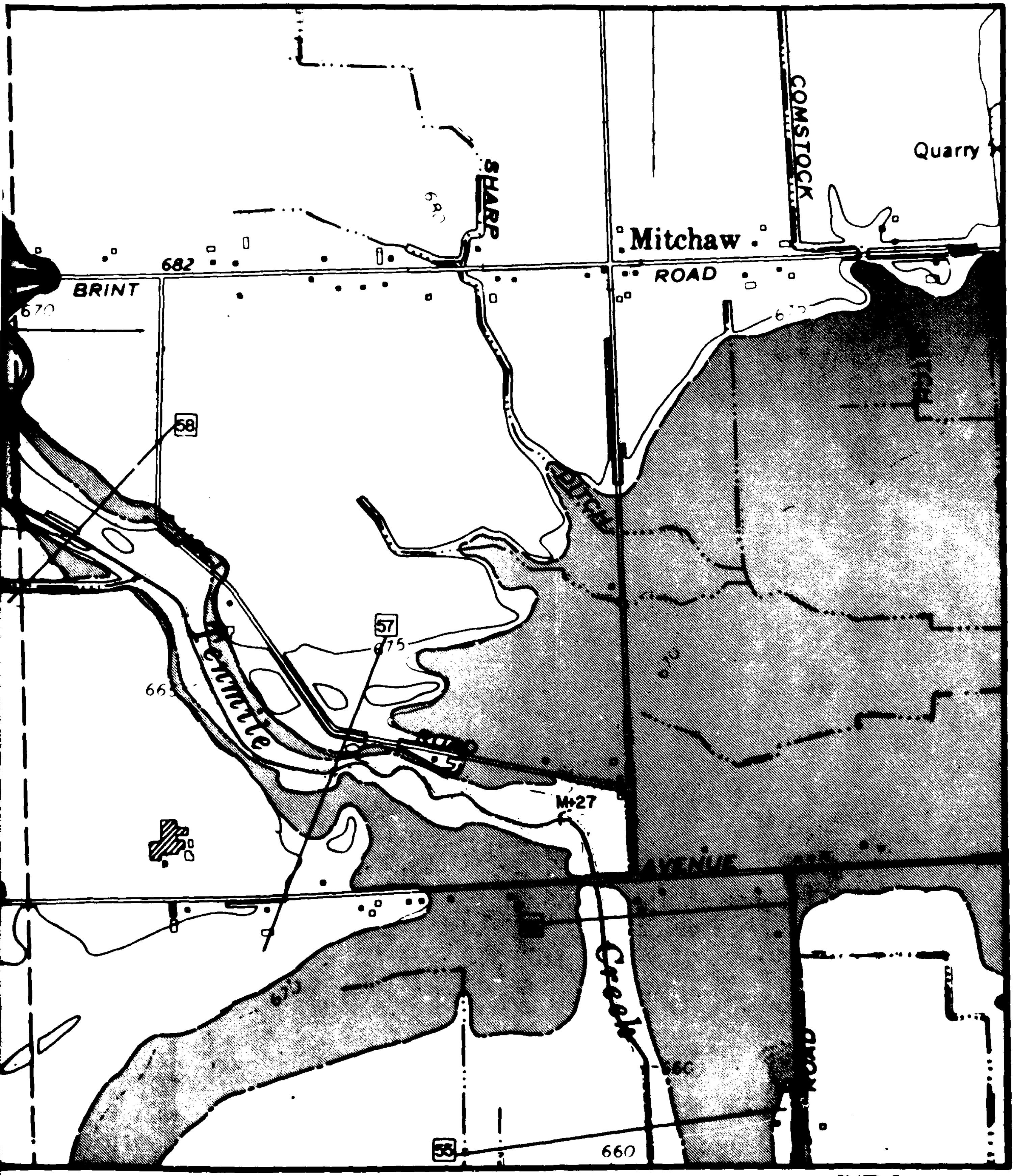
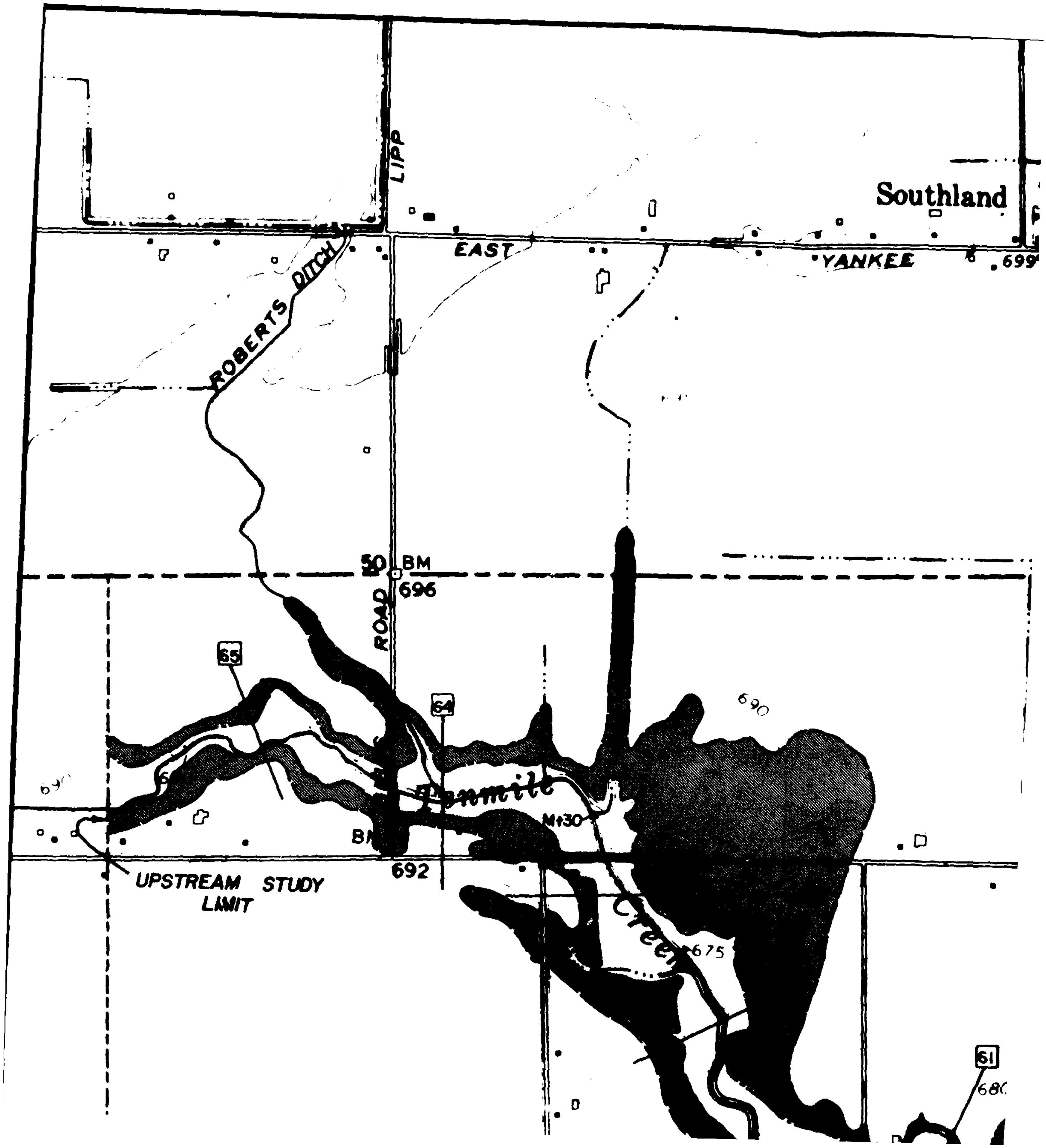
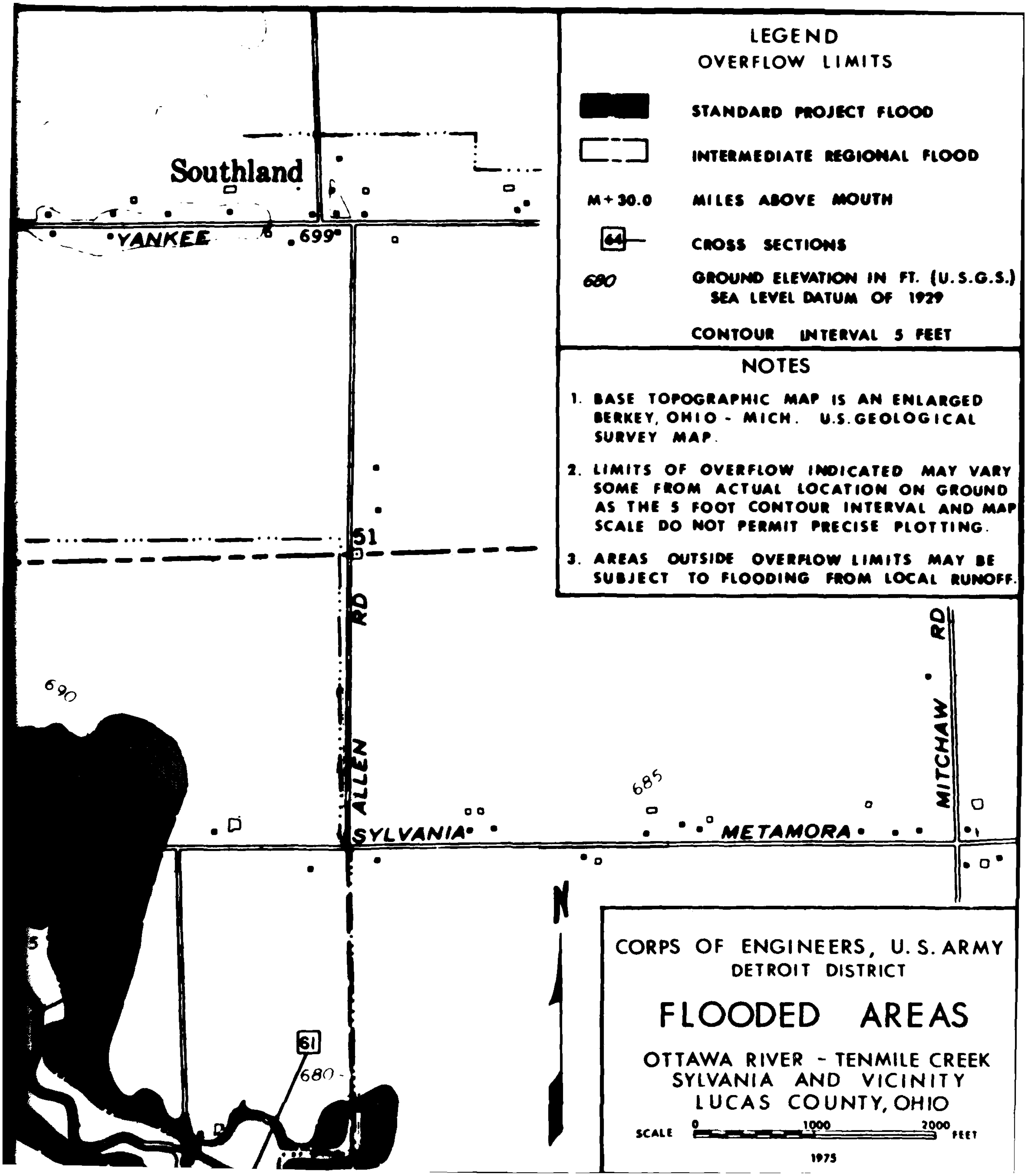

COMSTOCK
Quarry
SHARP
Mitchaw
682
BRINT
ROAD
670
58
DITCH
57
675
665
M-27
AVENUE
Creek
660
55

PLATE 7


Southland
LIPP
EAST
YANKEE
699
ROBERTS DITCH
50
BM
696
ROAD
65
64
690
M+30
BM
692
UPSTREAM STUDY LIMIT
Creek
675
61
680


LEGEND
OVERFLOW LIMITS
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
M+30.0 MILES ABOVE MOUTH
64 CROSS SECTIONS
680 GROUND ELEVATION IN FT. (U.S.G.S.) SEA LEVEL DATUM OF 1929
CONTOUR INTERVAL 5 FEET
NOTES
1. BASE TOPOGRAPHIC MAP IS AN ENLARGED BERKEY, OHIO - MICH. U.S.GEOLOGICAL SURVEY MAP.
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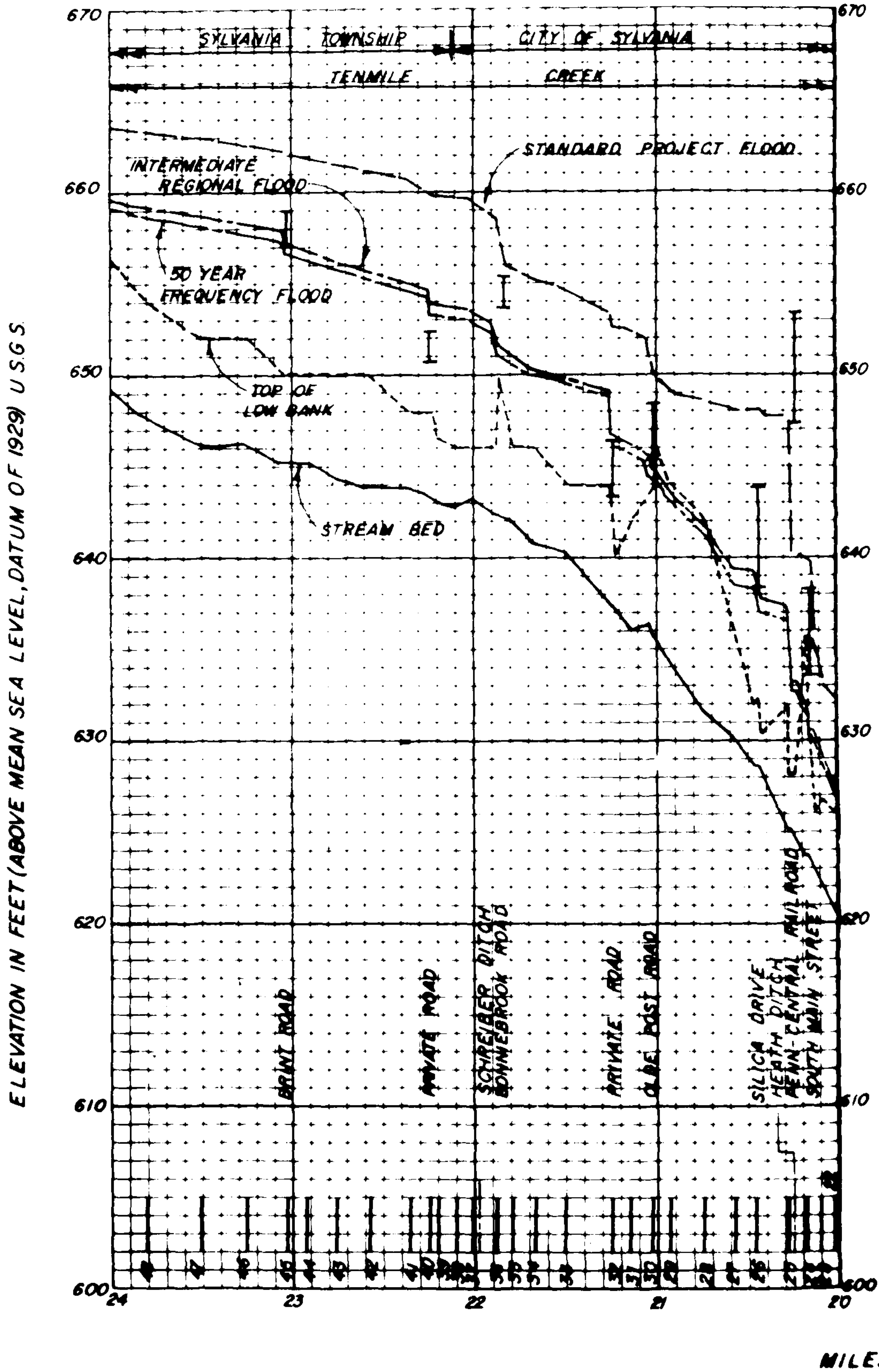
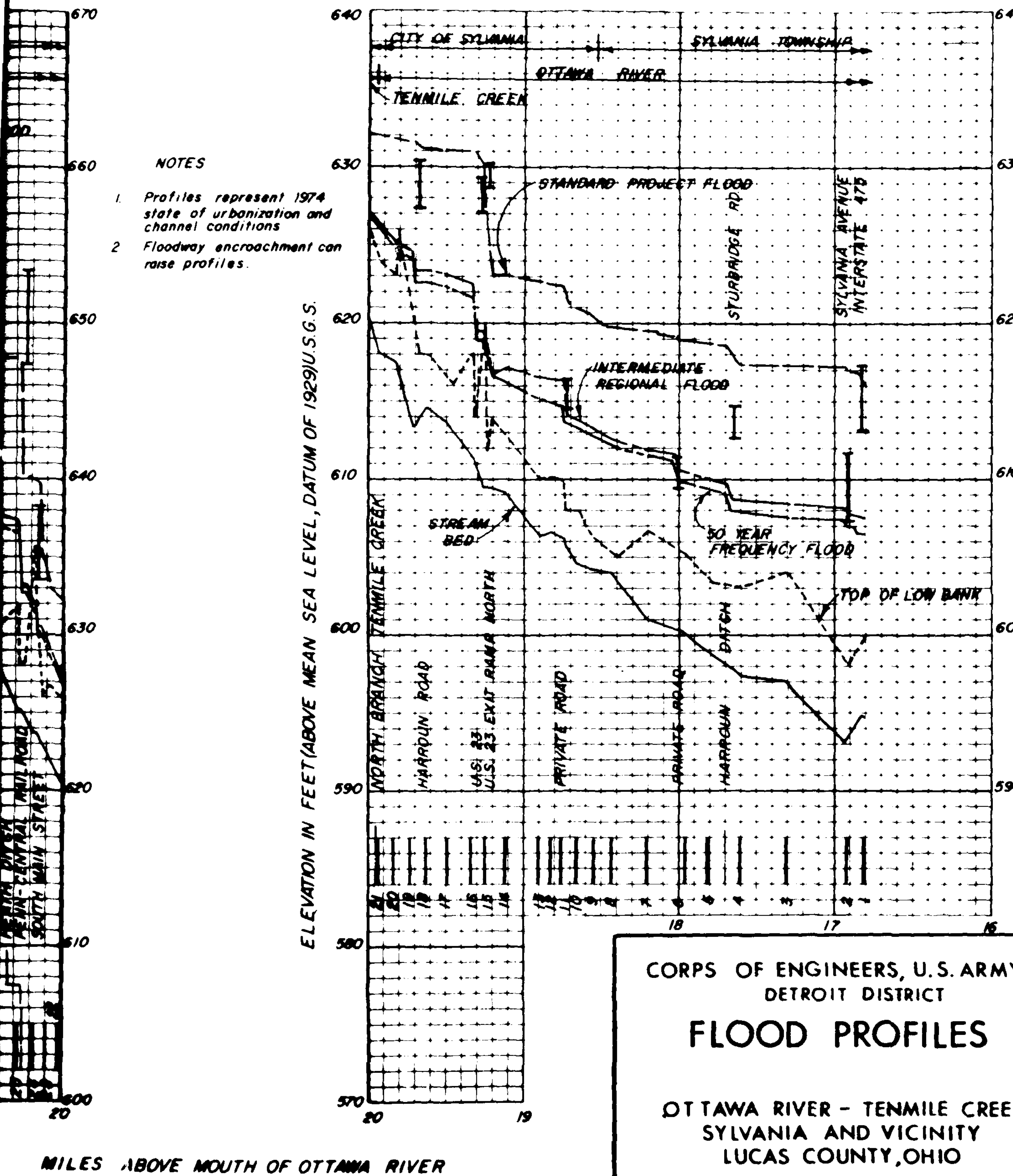
3. AREAS OUTSIDE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
Southland
YANKEE
699
51
ALLEN RD
690
685
SYLVANIA
METAMORA
MITCHAW RD
61
680
N
CORPS OF ENGINEERS, U. S. ARMY
DETROIT DISTRICT
FLOODED AREAS
OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO
SCALE 0 1000 2000 FEET
1975




NOTES

1. Profiles represent 1974 state of urbanization and channel conditions
2. Floodway encroachment con raise profiles




NOTES

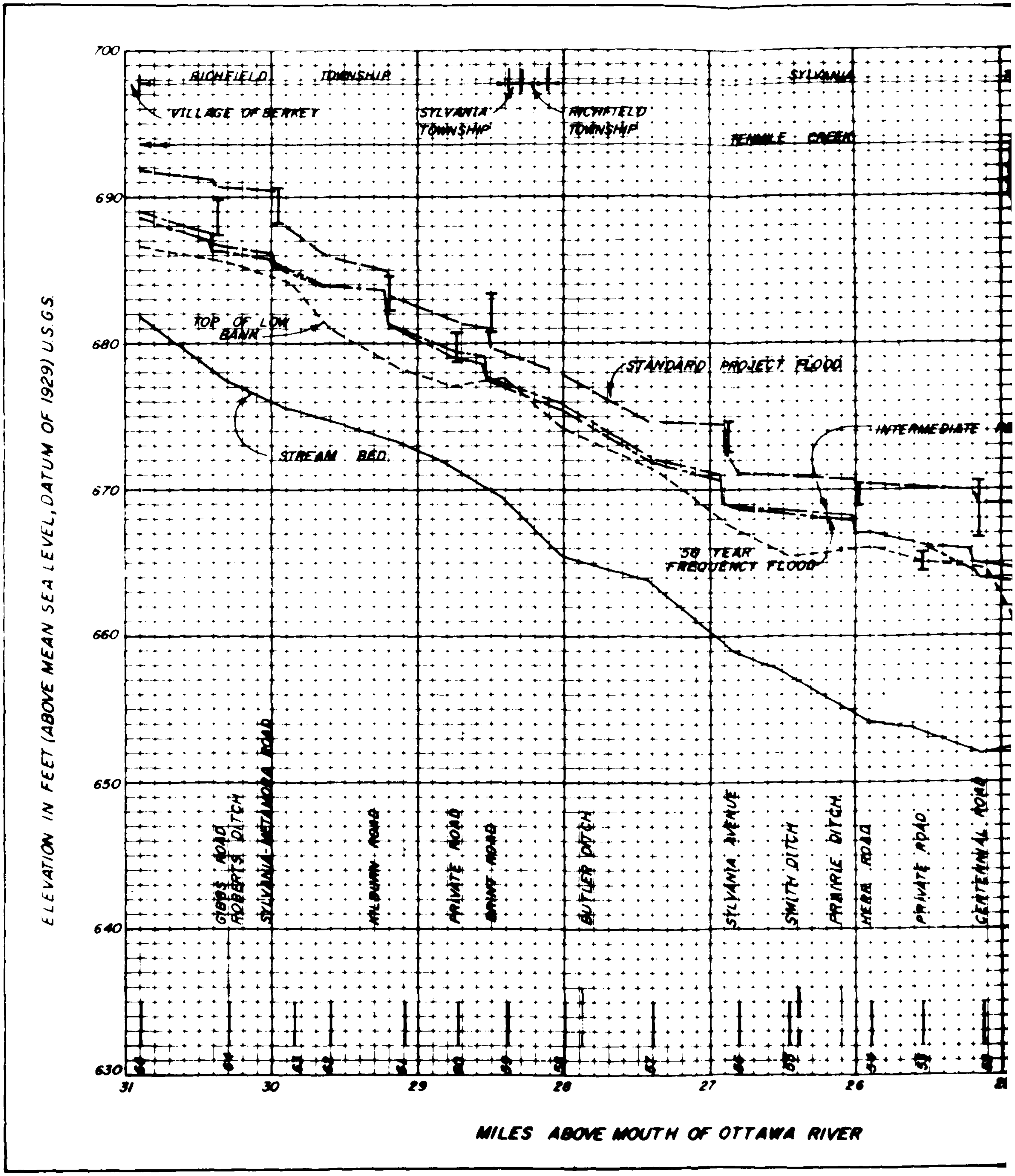
1. Profiles represent 1974 state of urbanization and channel conditions
2. Floodway encroachment can raise profiles.

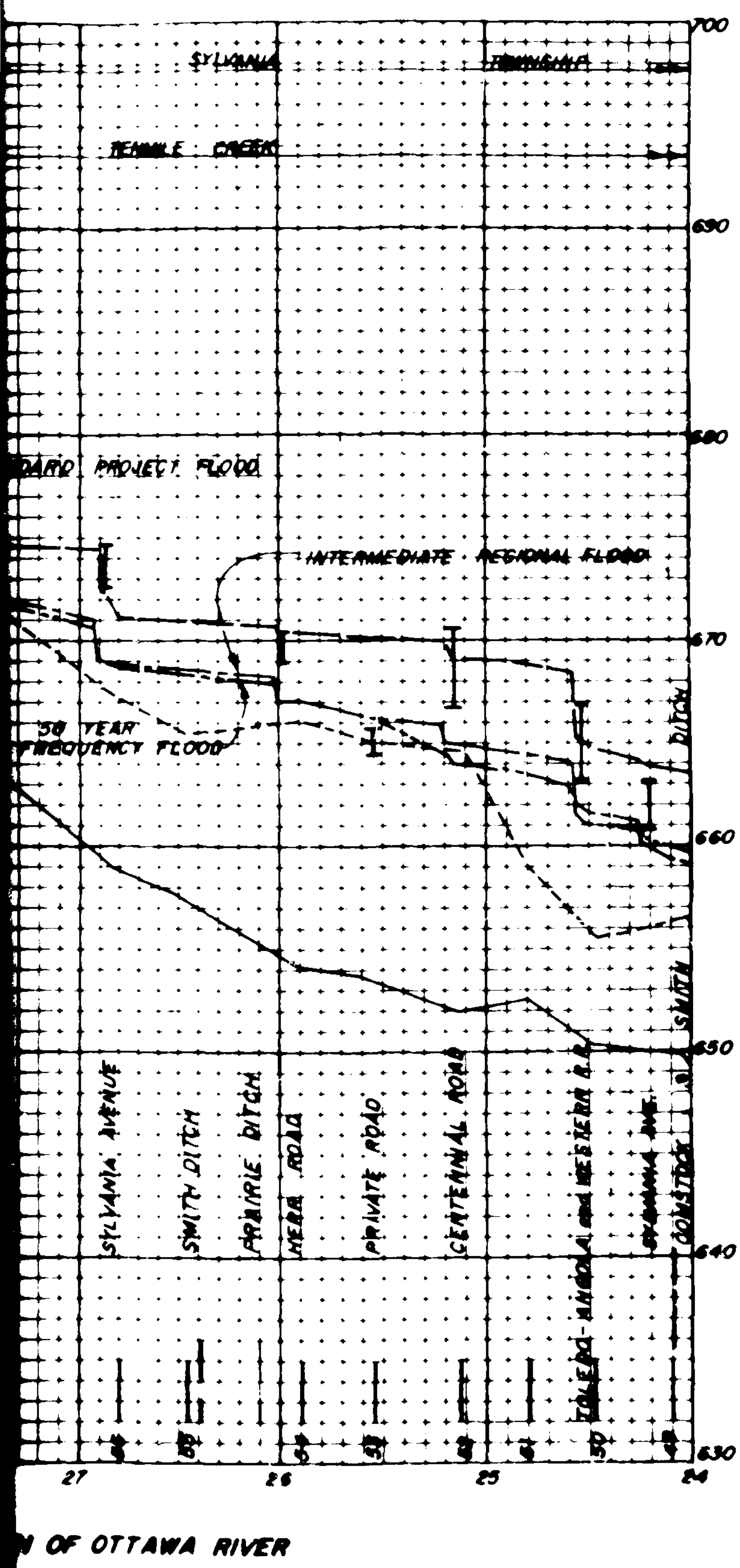
CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT

# FLOOD PROFILES

OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO

1975


RICHFIELD TOWNSHIP
VILLAGE OF BERKEY
SYLVANIA TOWNSHIP
RICHFIELD TOWNSHIP
SYLVANIA
TENMILE CREEK
TOP OF LOW BANK
STANDARD PROJECT FLOOD
STREAM BED
INTERMEDIATE
50 YEAR FREQUENCY FLOOD
GIBBS ROAD
ROBERTS DITCH
SYLVANIA-METAMORA ROAD
KILBURN ROAD
PRIVATE ROAD
BRINT ROAD
BUTLER DITCH
SYLVANIA AVENUE
SMITH DITCH
PRAIRIE DITCH
HERR ROAD
PRIVATE ROAD
CENTENNIAL ROAD
ELEVATION IN FEET (ABOVE MEAN SEA LEVEL, DATUM OF 1929) U.S.G.S.
700
690
680
670
660
650
640
630
31
30
29
28
27
26
MILES ABOVE MOUTH OF OTTAWA RIVER




NOTES

1 Profiles represent 1974 state of urbanization and channel conditions

2 Floodway encroachment can raise profiles

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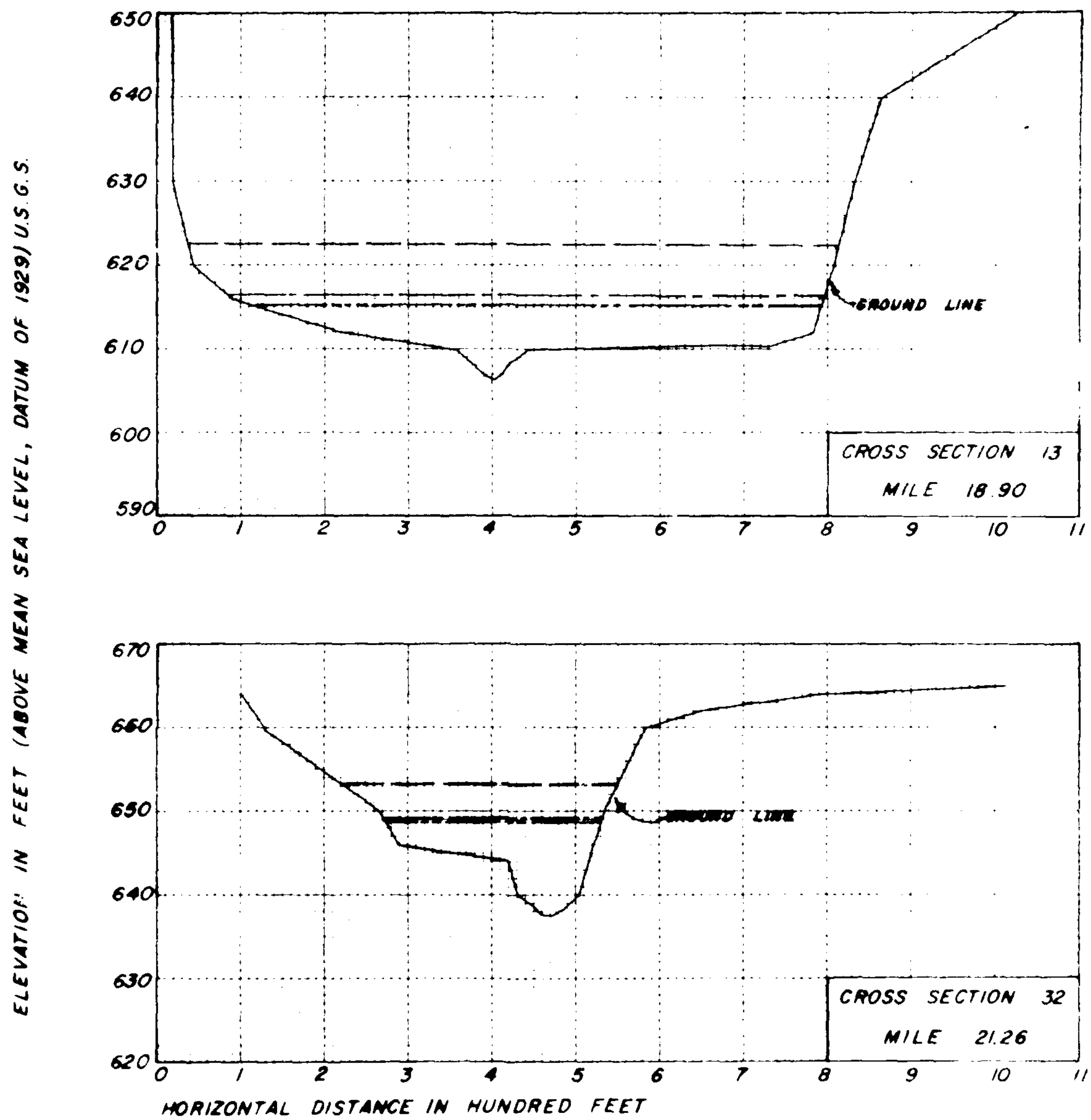
# FLOOD PROFILES

OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO

1975

PLATE 10




*LEGEND*

———— STANDARD PROJECT FLOOD

– – – – INTERMEDIATE REGIONAL FLOOD

-- – -- – 50 YEAR FREQUENCY FLOOD

Sections taken looking downstream, 60 sections not shown

Sections are based on actual field surveys and U S Geological Survey Maps

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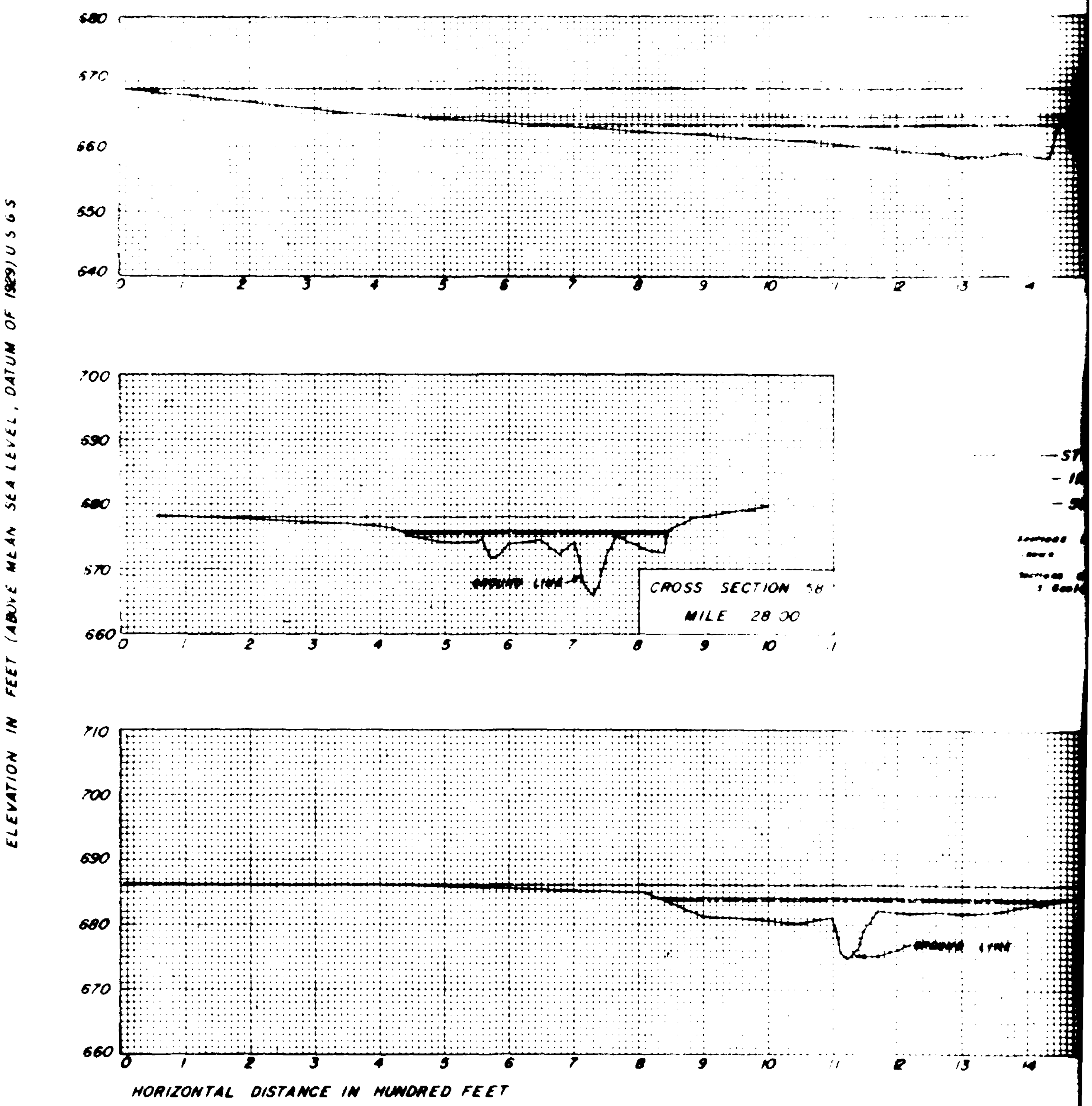
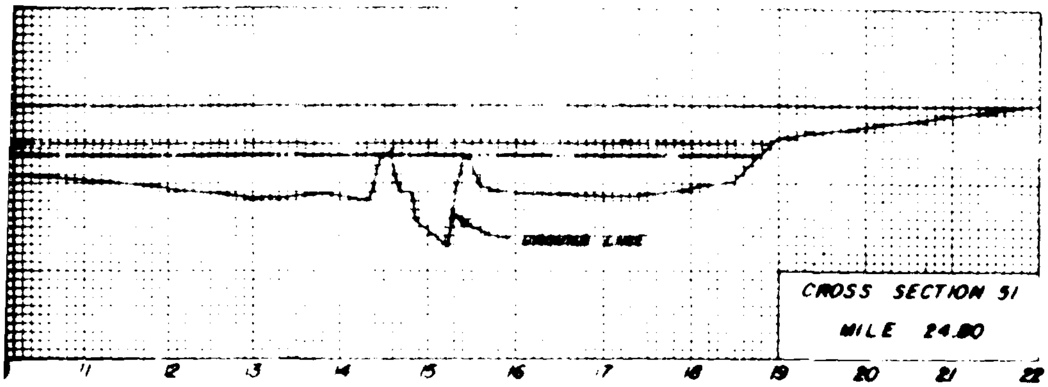
# CROSS SECTIONS

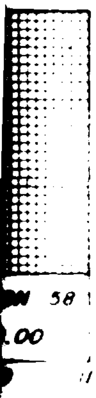
OTTAWA RIVER – TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO

1975



ELEVATION IN FEET (ABOVE MEAN SEA LEVEL, DATUM OF 1929) U S G S
CROSS SECTION 58
MILE 28.00
GROUND LINE
HORIZONTAL DISTANCE IN HUNDRED FEET



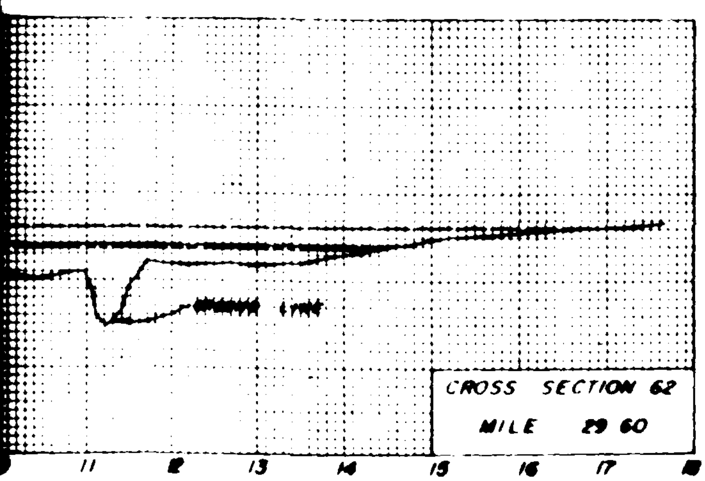




LEGEND

STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
50 YEAR FREQUENCY FLOOD

[illegible]

[illegible]

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# CROSS SECTIONS

OTTAWA RIVER - TENMILE CREEK
SYLVANIA AND VICINITY
LUCAS COUNTY, OHIO

1975

DATE
ILMED
-8